UNIVERSITY OF MICHIGAN
FEB 20 1952
MEDICAL LIBRARY

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY FEBRUARY 2 1952

TABLE OF CONTENTS

Treatment of Embolism and Thrombosis of the Cerebral Vessels
RENÉ LERICHE, M.D., F.R.C.S.(HON.) 231

Further Observations upon the Diagnosis of Deafness in Young Children
M. R. DIX, F.R.C.S., and C. S. HALLPIKE, F.R.C.P., F.R.C.S. 235

Habitual Abortion P. M. F. BISHOP, D.M., M.R.C.P., and N. A. RICHARDS, M.D., M.R.C.O.G. 244

Acute Polyarthritis with Pulmonary Consolidation and Pleural Effusion
A. W. LEES, M.D., F.R.F.P.S. 246

Duration of the Action of Different Insulins F. GERRITZEN, M.D. 249

Treatment of Hypertension by Oral Methonium Compounds
A. J. M. CAMPBELL, M.B., F.R.F.P.S., J. GIBSON GRAHAM, M.D., F.R.F.P.S., and R. D. H. MAXWELL, M.B. 251

M. & B. 1863, a Homologue of Hexamethonium, in Treatment of Hypertension
S. LOCKET, M.B., P. G. SWANN, M.D., W. S. M. GRIEVE, M.SC., PH.D., and H. P. PLAYER, M.R.C.S. 254

MEDICAL MEMORANDUM
A Case of Schönlein-Henoch (Anaphylactoid) Purpura Treated with A.C.T.H. E. J. S. WOOLLEY, M.B., M.R.C.P. 259

REFRESHER COURSE
The Pros and Cons of Immunization—II.
ROBERT CRUICKSHANK, M.D., F.R.C.P. ..268

GENERAL ARTICLES AND NEWS
THE LAW IN RELATION TO THE ILLEGITIMATE CHILD 271
NOVA ET VETERA 272
UNIVERSITIES AND COLLEGES 280
MEDICAL NEWS 283
BIRTHS, MARRIAGES, AND DEATHS 285
QUESTIONS AND COMMENTS 285

REVIEWS
Any Questions? 260
Gluteal Evolution 260
Varicose Veins 260
Corroboration in Psycho-Analysis 261
Clinical Pathology 261
Books Received 261

MEDICO-LEGAL
Death After Xylocaine Injection 280

Vital Statistics 281

LEADING ARTICLES
Sympathectomy for Cerebral Ischaemia 262
Preparing the Case 263
Diagnosis of Deafness in Children 264

ANNOTATIONS
Illegitimate Children 265
Intravenous Procaine for Pain Relief 266
Libel and Slander 266
Rift Valley Fever in South Africa 267

OBITUARY
Sir Arthur Gaskell, K.C.B., O.B.E., F.R.C.S. 278
Hazel H. Chodak-Gregory, M.D., F.R.C.P. 278
H. E. Symes-Thompson, M.D., M.R.C.P. ..278
J. A. Smith, M.B. 279
H. E. Murray, C.I.E., M.D., M.Ch., F.R.C.O.G. 279
F. H. Smith, M.B. 279
Reginald Nicklin, M.B. 279
W. H. Miller, M.D., F.R.C.S. 279

CORRESPONDENCE
Paying for the Health Service. H. A. MARQUAND, P.C., M.P. 272
Ovarian Dysmenorrhoea. ALECK BOURNE, F.R.C.S. 272
Sexual Disorders in Women. P. R. BOUCHER, M.B. 273

SUPPLEMENT
For Contents see First Page of Supplement

CORRESPONDENCE—*cont.*
Music While You Operate. W. J. BOLD, L.M.S.S.A. 273
Anaesthetic Explosions. N. C. HYPHER, M.R.C.S. 273
Night Pain with Fractures. J. MACKINTOSH, M.B.; M. PICKERING PICK, F.R.C.S. 273
Traumatic Autografting. J. M. ROBERTS, M.B. 274
Cough Fracture in Late Pregnancy. W. M. CHESNEY, M.B. 274
Shortage of *X*-ray Films. JOHN CROFTON, M.D.; E. POSNER, M.D. 274
Dead or Alive? T. O. GARLAND, M.D. 275
Tablet Test for Urinary Chloride. E. B. LOVE, B.SC. 275
Fantus Estimation of Urinary Chloride. W. H. TAYLOR, B.M. 275
Educating the Public About Cancer. A. RENDLE SHORT, F.R.C.S. 276
Congenital Defects in Mongols. L. M. ROSE, B.M. 276
Diabetic Gangrene. W. E. SHUTE, M.D., and E. V. SHUTE, M.B. 276
Rapid Cure of Actinomycosis. A. H SANGSTER, F.R.C.S. 277
Westergren and Wintrobe Methods Compared. J. W. SHACKLE, M.B. 277
Toxic Chemicals in Agriculture. P. LESLEY BIDSTRUP, M.B., and DONALD HUNTER, M.D. 277
Points from Letters 277

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4752, WEEKLY, PRICE 2/-

Copyright

REGISTERED AS A NEWSPAPER

Published by Saunders

THE SPECIALITIES IN GENERAL PRACTICE
Edited by RUSSELL L. CECIL, M.D., Professor of Clinical Medicine, Cornell University.
818 pages. 470 illustrations. 72s. 6d.

ATLAS OF NORMAL RADIOGRAPHIC ANATOMY
By ISADORE MESCHAN, M.A., M.D., Professor of Radiology, University of Arkansas.
593 pages. 1,044 illustrations. 75s.

CLINICAL UROGRAPHY
An Atlas and Textbook of Roentgenologic Diagnosis
By WILLIAM F. BRAASCH, M.D., and JOHN L. EMMETT, M.D., both Consultants in Urology, Mayo Clinic.
736 pages. 1,361 figures. £6 5s.

PEPTIC ULCER
Clinical Aspects, Diagnosis, Management
Edited by DAVID J. SANDWEISS, M.D. Published under the auspices of the American Gastroenterological Association.
790 pages. 164 illustrations. 75s.

SURGICAL PRACTICE OF THE LAHEY CLINIC
By Members of the Staff of the Lahey Clinic, Boston.
1,028 pages. 784 illustrations. 75s

CLINICAL PEDIATRIC UROLOGY
By MEREDITH CAMPBELL, M.S., M.D., F.A.C.S., Professor of Urology, New York University.
1,113 pages. 543 illustrations. 90s.

PSYCHOSOMATIC GYNECOLOGY
By WILLIAM S. KROGER, M.D., Assistant Professor of Obstetrics and Gynecology, Chicago Medical School; and S. CHARLES FREED, M.D., Adjunct in Medicine, Mount Zion Hospital, California.
503 pages. 40s.

TEXTBOOK OF REFRACTION
By EDWIN FORBES TAIT, M.D., Ph.D., Associate Professor of Ophthalmology, Temple University School of Medicine.
418 pages. 93 figures. 40s.

THE MEDICAL AND SURGICAL CLINICS OF NORTH AMERICA
These CLINICS offer Postgraduate Study at its very best. They give you the NEW THINGS IN MEDICINE AND SURGERY—while they are still new. They are published every other month throughout the year.

Thousands of doctors and surgeons all over the world subscribe to the CLINICS, and are generous in their praise of them. With few exceptions they continue to subscribe until retiring from practice.

Please write for further particulars

(The prices quoted are special prices which apply only to United Kingdom and Eire.)

W. B. SAUNDERS COMPANY LTD. **7, Grape Street, LONDON, W.C.2**

SURGICAL SERVICE SALTAIR

SALT & SON LTD. — for —

SURGICAL BELTS and CORSETS to individual measurements

ELASTIC HOSIERY in all Thread Elastic qualities

TRUSSES for all types of hernia, to individual requirements

ORTHOPAEDIC APPLIANCES

ARTIFICIAL LIMBS, etc., etc.

An Invitation

Our services are available free of charge to the Medical Profession in carrying out work of an experimental nature for any new type of surgical support.

LONDON ADDRESS FOR APPOINTMENTS:—
1. STANLEY HOUSE. 103, MARYLEBONE HIGH ST.,
LONDON, W.1. TEL. WELBECK 3034.

HEAD OFFICES:
BIRMINGHAM, 2

KAYLENE BRAND

The Liniment with a constitutional action

ANALJOL

A methyl aspirin preparation for external use in rheumatism and neuritis. It is non-staining and non-greasy and has an agreeable odour.

A double action, analgesic and counter-stimulant, supported by the effects of aspirin esters operating locally and constitutionally, ensures substantial relief from pain arising from the common fibrositic disorders of muscles, ligaments, nerves and joints.

Formula :—
Methyl Aspirin 12% Phenyl Aspirin 2%
Camphor 12% Menthol 8.75%
Ol. Thymi Rub. 8%
Alcoholic Solution of Terpineol 57.25%

Samples and literature on request

KAYLENE, LTD.
Sole Distributors: **ADSORBENTS LTD.**
WATERLOO ROAD, LONDON, N.W.2

BRITISH MEDICAL JOURNAL

LONDON SATURDAY FEBRUARY 2 1952

TREATMENT OF EMBOLISM AND THROMBOSIS OF THE CEREBRAL VESSELS*

BY

RENÉ LERICHE, M.D., F.R.C.S.(Hon.)

Professeur au Collège de France

I should like to call your attention to the possibility of influencing cerebral circulation by very simple methods in cases of cerebral vascular accident caused either by embolism or by thrombosis. I shall not concern myself here with head injuries justifying surgical intervention at the site of the haemorrhage, but will refer only to medical cases in which coma can be alleviated in a few minutes and the extent of the hemiplegia considerably reduced.

I should like, too, to tell you about the hypothesis that has guided me in my clinical researches on this matter for 25 years. I started from the same general pathological principle which I tried to verify in other parts of the body : autonomic dysfunction—that is, a vasomotor disturbance—usually precedes, often causes, and practically always accompanies such a vascular accident.

In the case of the cerebral circulation, I presupposed that isolated spasm could exist, comparable to that which may be observed in the limbs. And particularly I thought that such a spasm would always accompany the occurrence of an embolism or thrombosis, causing around the ischaemic area perifocal zones of diminished circulation.

I knew that the then prevailing ideas did not take into consideration the possibility of vasomotor reactions in the cerebral arteries. It was claimed, with a certain degree of finality, that the brain circulation was protected from vasomotor fluctuations by some extracranial regulating system. About 1920 I undertook to investigate this question. In various clinical conditions, working mostly on war-wounded who had undergone brain surgery, I performed what I called an "internal carotid sympathectomy" ; in other words, I removed as much as I could of the tunica adventitia of the internal carotid, starting from its bifurcation. Immediately the artery would contract ; then the retinal vessels diminished in calibre and the retinal pressure dropped. After a few hours a vasodilatory reaction would be observed, evidenced by dilatation of the same retinal vessels with rising of the retinal pressures. Simultaneously the flattened trephine scars would be seen to swell. When dealing with patients with Jacksonian epilepsy due to war injuries, I would first perform this internal carotid sympathectomy under local anaesthesia, then immediately after, still under local anaesthesia, widely open the skull to excise the arachnoid cortical scar tissue. The cortical vessels of those patients were so constricted that it appeared to me that this operation should provide a means of ensuring preliminary haemostasis in brain surgery, and at the time I reported a number of operations performed in this fashion. Denervation of the carotid body gave the same results.

This substantiated the idea that the small brain arteries had their own vasomotor control. Moreover, it was histologically confirmed that the pia mater and intracerebral arterioles had a double innervation of myelinated and amyelinated fibres. This was not consistent with a total functional inactivity. At any rate, from that time on it seemed to me that it was possible to modify the activity of the cerebral blood vessels by surgical intervention, and I should like to give you two examples of what can be accomplished.

Effects of Resection of a Thrombosed Common Carotid Artery and of Pericarotid Sympathectomy in Certain Intracranial Conditions

Case 1

A 35-year-old man was sent to me in 1941 on account of a painful paralysis of the brachial plexus. Because of considerable dysarthria he had great difficulty in telling me how he was wounded by a bullet which entered through the left side of his neck and came out below the scapular region. His arm was paralysed immediately. Picked up by the Germans, he discovered that he could no longer talk. He had complete aphasia, no hemiplegia, but very unpleasant tingling sensations in the right leg. He was repatriated on account of his wound, and when I saw him I noted the following three points:

1. Complete paralysis of the deltoid, supraspinatus, infraspinatus, biceps, triceps, pronator, and supinator muscles. The movements of the hand were normal. I supposed that there must have been an injury of the upper branches of the brachial plexus. The patient complained of acute pains in the arm.

2. A considerable degree of dysarthria ; his voice was smothered, non-bitonal, and there was a slight hemiplegia on the right side.

*Being a lecture delivered at the Institute of Neurology, London, on July 3, 1951.

3. In the neck region a long scar extended over the site of the carotid junction, suggesting a carotid lesion. The most careful palpation could detect no carotid beat. It was my impression that the aphasia must have been caused by sudden ischaemia of the brain. I therefore examined the other side and found a slight but unmistakable hemiplegia with hyperaesthesia of the abdominal wall and a definite Babinski sign.

The hospital neurologist concurred in the diagnosis of definite signs of a pyramidal lesion. Examination by the laryngologist showed a paralysis of the hemilarynx with hemianaesthesia, but the difficulty of speech was ascribed to a central lesion. I therefore decided to perform a double exploratory operation: one to verify the condition of the left carotid, and another to explore the left brachial plexus.

Nineteen months after the initial injury I found the common carotid in a mass of scar tissue. In its lower part, and up to the bifurcation, the artery was like a cord filled throughout with scar tissue. Lower down, the artery had the shape of a spindle ending at the site of the obliteration, which began about 2 in. (5 cm.) from the clavicle, and a blood stream seemed to circulate from the external to the internal carotid. The vagus nerve was oedematous, and in the middle of it was a cicatricial neuroma. I injected procaine hydrochloride and resected the whole of the obliterated carotid segment. Histological examination showed an organized thrombosis.

In the evening some improvement of speech could be observed as well as a retrocession of the pain in the neck and shoulder. From this time the patient's condition continued to improve; speech became easier, and the signs of hemiplegia decreased. I shall make no mention of the laryngeal condition, of the second operation on the brachial plexus, or of the arthrodesis of the shoulder which was rendered necessary by paralysis of the deltoid.

When the patient was seen several years later his speech was almost normal and he had regained an important part of his movements. He could carry out his agricultural activities almost normally, and was married.

This case shows clearly the influence of resection of the thrombosed carotid on an old focus of cerebral ischaemia. Nothing is changed in the circulatory mechanism after the arteriectomy, and yet a great proportion of the symptoms attributable to a central lesion have decreased in a short time. This can be explained only by modifications of the vasomotor conditions comparable to those observed after performing an arteriectomy on a limb. It was my impression that the carotid had not been cut by the bullet, but had only been bruised. The endothelium had probably been torn, as I have observed on several occasions in arteries of the limbs. A spasm had certainly occurred at once, since the aphasia was immediately present. Then thrombosis set in. The circulation was re-established by a reversal of the blood stream into the external carotid, so that the ischaemia was of short duration. A zone of ischaemic necrosis resulted—at the margin of which perifocal circulatory disturbances manifested themselves—and disappeared after the arteriectomy.

Case 2

A priest was wounded on May 25, 1940. While crawling to the front lines he suddenly felt a shock, tried to stand up, and fell unconscious. He remained several days without being able to talk or move, and his hospital notes contain the following observations: "Right hemiplegia with aphasia, amnesia, visual disturbances, and meningeal reaction." When he became conscious again he could only utter some inarticulate sounds. During the next few weeks there was some improvement, and after two months he began to read and was able to make some movements. But he could not keep his attention on anything, and most of the time he could not understand what he was reading or what he was being told.

I saw him six months later, in January, 1941. About 2 in. (5 cm.) from the sternum, inside the carotid line, I found the entrance scar of the bullet, which had gone out at the back, near C 6. Carotid pulsation was present. There was evidence of a regressing right hemiplegia. The patient walked with a circular swing. He could only move his hand slowly and with difficulty. The reflexes were exaggerated, and a facial weakness was present. There was also a left Claude Bernard syndrome and a lesion of the lower branches of the brachial plexus with atrophy of the thenar and hypothenar muscles. There was anaesthesia of the C 8–T 1 territory. He had stuttering dysarthria. Ideation was slow, with lapses. The patient could not make conversation and could not follow a lecture. He forgot things, and was unable to say mass through lack of memory.

In view of the presence of carotid pulsation I felt that the ischaemia must be due to a spasm. I decided to try an infiltration of the left stellate ganglion. The result was extraordinary; in a few minutes speech improved, and ideation became easier. The rhythm of the conversation was entirely changed, and this improvement persisted until the next day.

During the next few days 11 injections were made in the stellate ganglion, all with favourable results, so that the patient was soon able to say mass again. In view of this, on January 17 I decided to operate. Under local analgesia the carotid was exposed; this artery was not obliterated, and pulsations were present above and below the scar area. At this point, however, it was immobilized by sclerosis of the tunica adventitia, which was removed entirely up to the bifurcation. The same evening the patient could speak much more easily and stated that he could think almost normally. After a few more days I noted that the improvement of both speech and ideation was maintained. Moreover, there was a definite improvement of hand movements, especially of the index and middle fingers, which could be moved independently; this had been impossible. Walking was unchanged. After 10 days the patient went home delighted with the results obtained.

Eight years later he wrote me: "I take part in discussions and in all conversations. My speech is still improving. Reading remains 50% slower than it was. My right leg is almost normal. I can ride a bicycle 30 to 40 kilometres without fatigue. My memory is quite fair, though not completely restored."

This case is very instructive. The results of the first injection in the stellate ganglion were really dramatic. In less than one minute speech was transformed, and so was ideation. All this can be accounted for only by vasomotor modification of the brain arteries, and indicates that functional disturbances were added to the original ischaemic lesion. The pericarotid sympathectomy had the same permanent results. I cannot find any other explanation than that of an arrested activity of some of the brain vasoconstrictors.

It appears, therefore, that perverted circulation in the neighbourhood of a zone of ischaemic necrosis of the brain can be modified by working on some organ outside the brain.

Local Vasomotor Autonomy of the Cerebral Arteries

To the above I wish to add some clinical observations which seem to indicate that there exists a sort of autonomy of the vasomotor vessels of the brain, although this is not a recognized fact in physiology. Pathological physiology will sometimes reveal possibilities of reactions which experimentation cannot demonstrate. At a time when the methods of haemostasis had not yet been perfected, it was possible to observe in the course of some surgical procedure, or when clipping a vessel, a sudden local vasodilatation evidenced by congestion and an immediate oedema which would hide everything from view. Similarly, in cases of trauma of the brain, small haemorrhagic zones may be observed at a distance from the site of the traumatic lesion, and

sometimes even in the brain stem or in the bulb, which can only be due to diapedetic haemorrhage of vasomotor origin.

This shows that vasomotor reactions in the brain are not always of extracerebral origin and that they may be the consequence of a local injury.

Localized or Clinical Spasms

Observation on patients suffering from disturbance of the cerebral circulation, especially those who probably have had a stroke, reveals some facts which can be interpreted only as resulting from a local spasm of the brain arteries.

First, one will occasionally find in patients suffering from high blood pressure a disappearance of the transient manifestations following a cerebral vascular accident, which cannot be accounted for by anything but excessive vasoconstriction. All of a sudden aphasia will be present, sometimes with paraesthesia of an arm or leg; then everything disappears without leaving any trace, and this for a long period. At times such manifestations will precede a stroke by several months, or even several years. In one case in which the symptoms had lasted several hours a stellate-ganglion block cleared the aphasia in a few seconds.

There are cases, too, in which coma occurs only after hours of slight paralysis. Recently I saw a 42-year-old physician who woke up one morning with a left facial paresis. He attended to his business the whole morning, had lunch as usual, carried out his customary activities in the afternoon, and went out in his car; but towards the end of the day he experienced some difficulty in driving. After he got home, paralysis progressively invaded his arm, then his leg, and finally he became comatose. The coma lasted until the next morning. He recovered from it, but the hemiplegia persisted.

These facts led me to think that in cases of accidents to the brain vessels there always is added to the thrombosis, or to the embolism, a vasomotor reaction which enlarges the field of ischaemic disturbances producing coma.

Attempts at Section of the Cervical Ramifications in Hemiplegia

On the basis of this hypothesis, in 1925 I performed a section of the communicating cervical ramifications on a patient suffering from hemiplegia. There was considerable improvement. Royle had already performed an identical operation, but his object had been to relieve the contraction, whereas my own objective was to modify the circulation. I have always expounded the principle that surgery of the sympathetic system is above all concerned with vasoconstriction.

Subsequently I made three other such operations with appreciable results. In 1936, in a case of Wallenberg (Babinski–Nageotte) syndrome with hemiparesis and hemianaesthesia, the presence of grave angina pectoris attacks induced me to perform a stellectomy. The heart attacks disappeared and there was at the same time considerable improvement of the hemiparesis, ataxia, and lateropulsion. The improvement still persisted after a year.

Attempts at Treatment of "Strokes" by Stellate-ganglion Block

In 1932 I had obtained remarkable results by performing a stellate-ganglion block in a case of hemiplegia due to birth traumatism in a young boy. This fact, added to previous observations, gave Fontaine and myself the idea of trying to treat strokes due to embolism by infiltration of the stellate ganglion. We had an occasion to do this on May 5, 1936.

On that date I was called at 8 a.m. to see an obese woman who, a week before, had undergone hysterectomy for a voluminous fibroma and who had suddenly become comatose. She did not respond to any form of stimulation. Her breathing was very irregular. Death appeared imminent. An injection was immediately made in the stellate ganglion (approximately an hour after the onset of the symptoms) on the left side, as the right limb seemed more inert than the left one. After five minutes breathing became more even and the pulse slower. Half an hour later the coma subsided and the patient responded to stimulation by groaning. In the afternoon her condition was completely changed: her breathing was no longer stertorous, and the pulse was regular. Hemiplegia still persisted, but the aphasia seemed to be regressing. The next day another injection was given, as a result of which the patient was able to speak slowly but very distinctly, without stuttering. She was also able to move her fingers very slightly. Two more injections were made in the stellate ganglion during the following days, and after each one the motility was improved. After a week speech was clear. The limbs were gradually regaining their movements, although these were still slow and spastic, and there was a persistent Babinski sign. In spite of this the hemiplegia was obviously regressing.

At the beginning of June the patient got out of bed; she dragged her leg in walking. The movements of her right arm were clumsy and slow, and she could not raise her arms above the level of the shoulders. Improvement continued during the next few weeks, and the movements of the fingers became easier.

On August 3 she was sent home with only faint traces of her hemiplegia and a perfectly normal cerebral function.

Undoubtedly the stellate-ganglion block saved this patient and promoted favourable progress. We made the mistake, both Fontaine and I, of not continuing the infiltrations, and perhaps, too, of not having given her two a day. This would probably have shortened her convalescence.

A few months later we were presented with a new case of cerebral embolism in a 56-year-old woman following removal of a uterine polyp. On the third day after the operation there appeared a slight facial paralysis with aphasia and right hemiplegia. Respiration and pulse were normal. An injection was immediately made in the stellate ganglion; half an hour later the patient could, with difficulty, pronounce a few words—she could slightly move her fingers. In the afternoon the improvement became more pronounced: speech, though still difficult, was intelligible. The movements were slow and feeble, but nevertheless present. The next day another infiltration was made, bringing about further improvement. The movements were easier and speech was improving. The next day, except for a slight difficulty in talking and some weakness of the movements on the right side, no trace of the accident to the brain was left. It would have been impossible to know that three days previously the patient had complete hemiplegia. Her reflexes had become normal again—and the recovery lasted.

These two observations were published in the *Revue de Chirurgie* in December, 1936. They did not make much impression in spite of the fact that we had suggested applying this method in cerebral vascular accidents and pointed out that it could occasionally be of great help in cases of hemiplegia of old standing, could improve speech in cases of aphasia, and could reduce the spasticity.

In 1938 Mackey and Lawrence Scott reported in the *British Medical Journal* (vol. 2, p. 1) a group of 19 cases of apoplexy treated by stellate-ganglion block. Nine of the patients showed improvement. Most of the failures were in cases of severe cerebral haemorrhage in old people; it should be noted, however, that Claude Bernard's syndrome was not always present, as it should be if the anaesthetic really reaches the stellate ganglion.

In 1948 Geza de Takats and Gibert tried this method on 25 patients who had had a stroke a few hours before. In 19 cases the results were favourable.

In August, 1950, Naffziger and Adams published in the *Archives of Surgery* (vol. 61, p. 286) a report covering 225 cases, for which a total of 700 stellate-ganglion blocks were

made; 155 of these patients had acute cerebral vascular accidents—thrombosis, embolism, or vasospasm—and 70 suffered from acute neurological deficiency due to trauma or brain surgery. The results were classified as good when recovery was complete, fair when there was only partial recovery, and poor when there was no immediate or subsequent improvement.

In the first group, comprising 155 cases, the result was good in 91 (59%), fair in 37 (24%), and poor in 27 (17%). In the second group, comprising 70 cases, the result was good in 30 (43%), fair in 30 (43%), and poor in 10 (14%). The authors' conclusion is that the stellate-ganglion block should have a definite part in the treatment of cerebral vascular disturbances.

My own experience is less extensive than Naffziger's. The following, however, is the procedure I should advise in such cases:

Make the infiltration as soon as possible on the opposite side to that of the paralysis. Begin with 10 ml. of 1% procaine. Make another injection of 20 ml. six hours later; then continue with one infiltration a day for fifteen days. There seems to be some advantage in occasionally giving the injection on the side of the paralysis and even in associating a lumbar infiltration with the stellate-ganglion block.

I might add that some physicians have observed a modification of the electrocardiographic curve following stellate-ganglion block; moreover, as I reported long ago, it also modifies the spinal fluid pressure.

Recently, A. de Souza Pereira, in view of the favourable results obtained by stellate-ganglion block 50 hours after the occurrence of an embolism, resected the middle-ganglion and the intermediate and upper part of the stellate ganglion, thereby obtaining a marked improvement in the patient's condition. Encouraged by this result, de Souza Pereira treated a number of hemiplegias of more or less long standing by sympathetic block followed by sympathectomy. He sometimes obtained progressive improvement—dramatic in some cases, slight in others—some patients regaining useful movements, while others were scarcely benefited. In order to clarify these facts further, de Souza Pereira experimented on dogs.

After tying the two internal carotid branches, he performed an arteriography, then a sympathectomy, and finally followed this by another arteriography. It was easy to observe on the arteriogram how the circulatory track was enlarged by the operation.

He then used the same method of arteriography to study the effects of ganglionectomy on man. The interruption in the sympathetic chain caused an increase in the blood circulation. Lubsen had already, in 1941, come to the same conclusion, but it was his impression that unilateral ganglionectomy, while increasing the blood flow on the operated side, diminishes it on the opposite side. It therefore appears from this that the intervention should be bilateral.

At the present stage of research, however, I do not believe that a sympathectomy should be performed too soon—I mean immediately after the stroke—on the human being. The stellate-ganglion block seems sufficient to give the desired results.

For the time being I would perform a sympathectomy only on patients who, after one or several cerebral episodes, live in terror of the future—perhaps with good reason. I have operated on this indication eight times during the past fifteen years. Because of the war I lost track of six of my patients. Here is one case report, however, which will make it possible to judge the efficacy of the method.

A man aged 49 had had mild diabetes for a long time. On November 6, 1948, while talking, he suddenly stuttered and could not finish his sentence. After a few seconds his malaise disappeared and he was able to talk again, but he had the impression that his left side was all cold, numb, and senseless. His movements were awkward, slow, and difficult. His blood pressure was 230/90 mm. Hg. From that time onwards the patient could walk only with difficulty, dragging his leg; the movements of his arm and leg were slow and incomplete, and the whole left side felt numb. He was forced to reduce his business activities considerably. He had difficulty in expressing himself and often had fits of dizziness.

He came to see me at the beginning of June, 1949. I noticed some difficulty of speech and the remnants of a left hemiplegia. Both arm and leg had lost considerable strength; there was hypoaesthesia of the left side, but not total anaesthesia. A feeling of constriction above the left knee annoyed him very much.

His blood urea was 28 mg. per 100 ml.; blood sugar 108 mg. per 100 ml., blood pressure 170/90 mm. Hg. An arteriography showed normal arteries.

On June 30, under local analgesia, I performed a section of the roots of the vertebral nerve on both sides. As usual the operation was followed by intense cephalalgia, which disappeared after a few days.

Twenty months later the patient came to see me for an arteritis of the leg. He stated that a few weeks after the operation he was able to resume his professional and family life, having regained his faculty of speech. He now spoke at a normal speed, without hesitation, and finished all his sentences. It would have been impossible to guess that he had a past history of disturbances of speech. Both arm and leg had regained normal strength; all movements were easy, though there persisted a feeling of numbness and the feeling of constriction above the knee was still present. Everything else was normal. His blood pressure was 170/90 mm. Hg.

Another patient, operated on in similar clinical circumstances a few months ago, is very much satisfied with the results obtained so far.

In all these cases I did not do a ganglionectomy but merely a section of the vertebral nerve roots at the upper pole of the stellate ganglion, as this suppresses most of the constrictors of the basilar artery.* The future will tell what the true value of this operation is. It must be remembered, however, that this operation, which should always be performed bilaterally, in either one or two stages, is followed for a few days by intense cephalalgia, probably due to meningeal congestion. This operation should perhaps be resorted to as a complement to the classical surgical treatment of patients having high blood pressure with cerebral manifestations, and also, perhaps, of those who have severe visual disturbances.

Stellate-ganglion Block in Old Hemiplegias

In cases of long-standing hemiplegia we must for the present be content with the results obtained from repeated stellate-ganglion blocks.

Since 1935 I have tried the stellate-ganglion block in a great variety of cases of hemiplegia. I began with those in which the patients complained of pain, and have generally succeeded in suppressing or at least attenuating the pain. Then I extended this form of treatment to patients whose condition was comparatively recent. Since 1945 I have treated over 100 patients by repeated infiltrations (from 12 to 36). It is impossible for me to give statistics and percentages, owing to the fact that the cases treated varied considerably in severity, extension, and duration. The general impression, however, is that the more recent the case the greater the chance of success; yet it is possible to obtain favourable results after several years. At all stages of the disease a number of failures must be expected: the result can be either insignificant or negative.

In some patients changes will indicate a functional share in the establishment of symptoms. For example, a 45-year-old woman stricken with aphasia was able to say a few

*A report on this operation was published in *Arch. ital. Chir.*, 1938, **52**, 659.

words within the hour following the stellate-ganglion block; then she gradually sank back into mutism.

Approximately one-third of the patients have a feeling of relief, are less contracted, and are more supple; and many walk very much better after a week. This improvement may be temporary, and sometimes the former condition will re-establish itself when the infiltrations are stopped. Or the improvement may be permanent, especially if the patient is determined to collaborate.

An example of this is the case of a 42-year-old physician who had had hemiplegia for 18 months, with a blood pressure of 200/100 mm. Hg, and had walked with difficulty, using a stick; the arm movements were incoordinate. After 39 stellate-ganglion blocks on the opposite side to that of the paralysis he can walk without his stick, and is now planning to resume some of his activities.

In another case, a man who could not hold a pencil in his contracted hand could, after 16 infiltrations, carry for fifteen minutes a basket filled with fruit.

Possibly these patients who can still be improved by delayed stellate-ganglion blocks could be benefited by sympathectomy. In my opinion they represent 25% of the cases I have treated, but I must say that for reasons of humanity I have made an attempt in some very old cases—of four to five years' duration. Let us hope that in the future such patients will be treated at an earlier stage. We must think of the despair of these unfortunate people abandoned without hope to their terrible fate.

Pierre Stricker, a neurosurgeon from Mulhouse, after performing a stellate-ganglion block for a two-year hemiplegia and seeing the patient resume his occupation, has since 1942 treated several cases of hemiplegia by repeated infiltrations of the upper cervical ganglion, and has just recently published some case reports which fully confirm those recorded above.

A recent attempt has been made to treat hemiplegia by carotico-jugular anastomosis. This operation does not seem to increase the number of arteries visible on the angiogram: the blood is mostly diverted into the veins, which become dilated, especially in the bulbar region.

According to the results of our experiments, the simplest and most efficient method seems to consist in giving emergency stellate-ganglion block treatment in cases of embolism and thrombosis, and, for patients who have missed this early chance, to resort to treatment which may vary from infiltration to resection of the thrombosed carotid and the various methods of sympathectomy—section of the vertebral nerve roots or ganglionectomies.

Conclusion

These are the facts and comments I wish to submit. I do not think that I have unduly emphasized the extent of the results obtained.

If it is true, as I have read, that there are each year in the United States 500,000 cases of apoplectic strokes and hemiplegia, I feel that a method which makes it possible to diminish the importance of these accidents deserves some consideration. There is, moreover, another side to the question—the tragedy brought into the life of those who survive the stroke by the persistence of hemiplegia and particularly aphasia. A famous American magazine some months ago very clearly described the facts which I have just stated, and gave the principles and results of the stellate-ganglion block. Since then I have received 200 letters, from different countries of the world, expressing the despair of those whom we call, without conscious irony, "cured apoplectics."

Anyone reading such distressing messages cannot fail to wish for the development of a method which would considerably minimize the gravity of the accident.

FURTHER OBSERVATIONS UPON THE DIAGNOSIS OF DEAFNESS IN YOUNG CHILDREN

WITH PARTICULAR REFERENCE TO THE MAKING OF RECOMMENDATIONS FOR SPECIAL EDUCATIONAL TREATMENT

BY

M. R. DIX, F.R.C.S.

Member of Scientific Staff, Medical Research Council; Assistant, Otological Research Unit, Medical Research Council, and Aural Department, National Hospital, Queen Square, London

AND

C. S. HALLPIKE, F.R.C.P., F.R.C.S.

Director, Otological Research Unit, Medical Research Council; Aural Physician, National Hospital, Queen Square, London; Assistant Aural Surgeon, University College Hospital, London

Since our first description of the peep-show technique for pure-tone audiometry in children under the age of 6 years (Dix and Hallpike, 1947), the equipment has been in regular use at weekly clinics at the National Hospital, Queen Square. In the course of this work certain developments have taken place.

In the first place, the mechanism of the equipment has been greatly improved and reconstructed in a simple and readily reproducible form. Secondly, we have had the opportunity during the examination of the considerable number of subjects involved—350 in all—of becoming familiar with certain technical and psychological difficulties which may arise in the course of the testing procedure, and have been able to formulate effective means of recognizing and overcoming these difficulties.

Furthermore, in the course of these investigations we have been asked to make recommendations, upon the basis of our findings, for the special educational treatment (S.E.T.) of the children in accordance with the well-known classification of deaf children proposed by the Board of Education (1938) in its special report. Here certain interesting difficulties have been encountered. Finally, we have been able in a number of cases to carry out a follow-up with a view to assessing the validity of our educational recommendations.

The publication of the present communication has, therefore, the following aims: (1) to give a detailed account of the mechanical improvements in the apparatus; (2) to describe the psychological and other difficulties which may arise in the course of the test procedure and the methods of overcoming them; (3) to describe and discuss our clinical material and test results; (4) to describe and discuss the problems arising in connexion with the making of recommendations for S.E.T.; and (5) to give the results of our follow-up.

Apparatus—1. The Child's Equipment

The general lines of the tests and of the peep-show equipment are best illustrated by two diagrams reproduced from our original paper (Figs. 1 and 2). The test procedure depends upon the conditioned response of the subject to a series of short pure-tone stimuli delivered from a loudspeaker. These pure-tone stimuli are synchronized with the

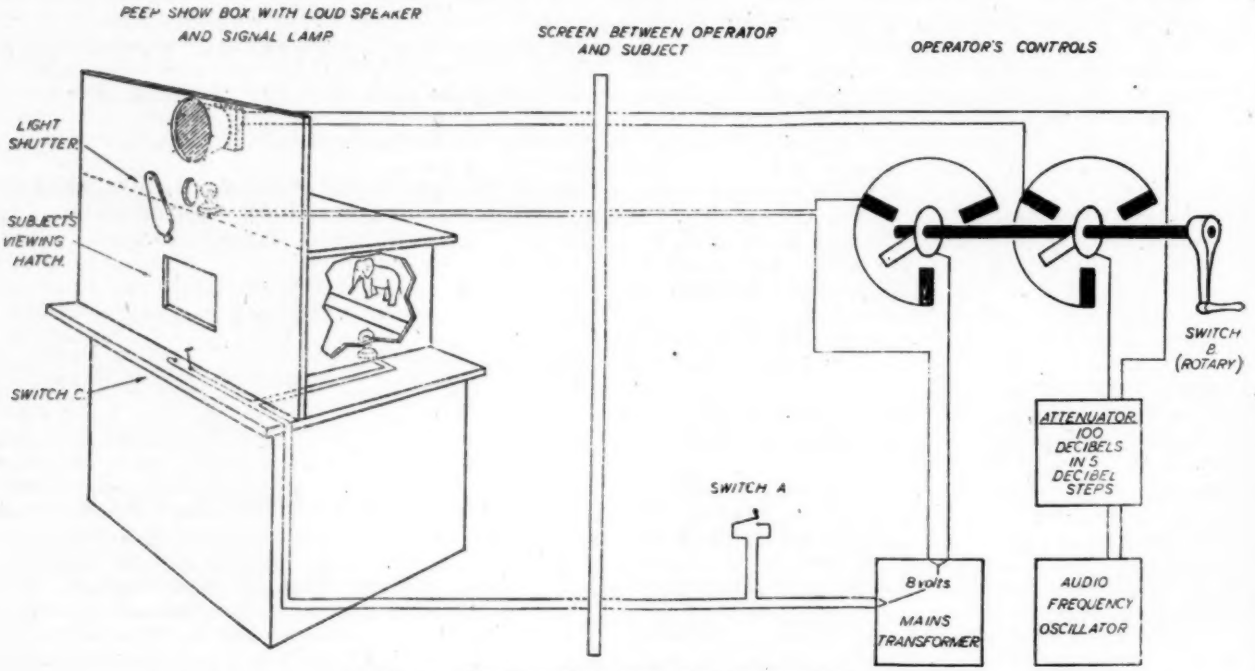


FIG. 1.—Diagram of the peep-show test apparatus.

flashes of a signal lamp. The child sits in front of the wooden box shown in Fig. 1, within which are displayed a series of attractive pictures. In order to be seen, these pictures have first to be illuminated by the child by the pressing of a button. Thereafter he inspects them through a viewing aperture. This press-button mechanism works only when the synchronized light/sound stimuli are being delivered. The stimulation mechanism is under the control of the tester, who observes the child closely from behind a screen. The pure-tone stimuli are variable in frequency in fixed octave intervals from 256 to 4,096 c.p.s. The intensity is calibrated in decibels above the threshold of hearing of a normal subject with his head in the position of the test subject. During the test an instructor is seated on the subject's right hand, and performs the important functions of controlling the child, encouraging him to co-operate in the test, and of changing the picture by the operation of a simple mechanism when necessary.

The test begins with the instructor focusing the child's attention on the viewing orifice. When the tester observes that this has been accomplished he applies the double signal, and the instructor at once presses the button, illuminates the picture, and encourages the child to inspect it. When this has been done the tester withdraws the signal and the picture disappears. After this demonstration has been repeated two or three times the child soon learns to press the button and illuminate the picture when, and only when, the double signal is being given. As soon as this reflex has been established the next step is to eliminate the light signal in the front of the box. This the instructor does by closing a simple shutter over the light. The test is then continued, using the interrupted sound stimuli only. In subjects without hearing this elimination of the light signal makes further response impossible; on the other hand, in subjects with sufficient hearing to detect the sound signal the elimination of the synchronized light signal makes no difference to their response and they continue to react to the sound signal alone. The intensity of the sound signal is then reduced progressively until a threshold reading is obtained. In Fig. 3 is shown a photograph of the equipment in its present form, as seen by the subject.

In order to gain his fullest co-operation it is important that the child should regard the peep-show as some attractive toy or game, and the design of the apparatus has thus been kept as simple and as small as possible. The box is painted in a gay colour with decorations carefully calculated to make the viewing-hatch the centre of attraction. This should be on the child's eye level as he sits comfortably in front of the box. The signal lamp is placed close enough above the viewing hatch to be included within the child's field of vision when he is inspecting this hatch. It should also be rather dull and inconspicuous in comparison with the brilliantly illuminated picture. Furthermore, the mechanism of its elimination—that is, by closure of a simple shutter—should be obvious to the child.

FIG. 2.—The apparatus in use.

The child's press-button mechanism should be of the simple bell-push variety; it needs to be of comfortable size, easy to work, and conveniently situated for operation by his right hand. Anything in the nature of a hand-rest in the vicinity of the bell-push is better avoided, as this usually results in the child keeping his hand very near or on the switch, and his responses are thus made more difficult to observe. Two

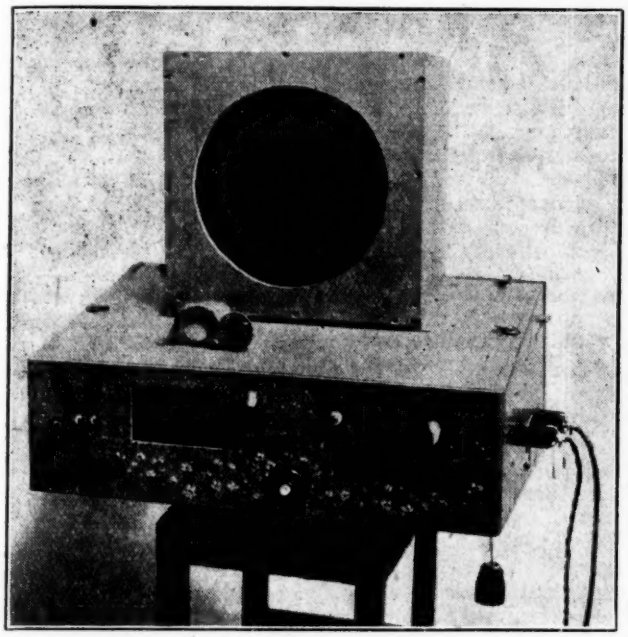


FIG. 3.—Photograph of equipment in its present form as seen by the subject.

small pilot lights are provided in the side of the box which faces the tester. These indicate to him the proper functioning of the signal lamp and the illumination of the pictures. The viewing aperture is closed by glass, which serves the purpose of preventing the child interfering with the picture. In addition, the reflections from the glass make it difficult for the child to see anything of the unilluminated picture. Details of the internal mechanism of the apparatus are given in Fig. 4.

2. The Pictures

It is important that the pictures should be brightly coloured and of suitable size. The size used is 7½ by 6½ in. (19 by 16.5 cm.). We find the pictures most easily obtainable from suitable magazines and books. They are mounted on thin aluminium plates made up into magazines of 25 to 30, which are loaded into the back of the apparatus at the beginning of a test. It is important to select pictures suitable for the age and sex of the subject, and this can easily be arranged. They are changed from time to time in the course of the test; this is done by the instructor by a simple string mechanism which operates very rapidly and quietly. It is seldom that more than 25 pictures are required for a full audiometric test.

3. The Tester's Equipment

That part of the equipment used by the tester—that is, the tone generator, interrupter switches and their associated circuits—has not been substantially modified from that described in our original paper. The output of a beat-frequency oscillator is led by way of a 60-decibel attenuator (input attenuator) to a power amplifier and thence through a 40-decibel attenuator (output attenuator) to a 12-in. (30.5-cm.) moving-coil loudspeaker. This arrangement of attenuators has been found necessary for the maintenance of background noise at a level insufficient to constitute a stimulus. This is, of course, a matter of great practical importance. For example, the deafness in certain subjects may be confined to the higher frequencies, with normal or near-normal hearing within the chief frequency range of 50 cycles mains' hum. Unless measures are taken with such subjects to keep the hum level below signal level at normal threshold intensity throughout the range of test frequencies, spurious responses will be obtained at the high frequencies to the hum alone and an apparently normal audiogram will result.

By far the greatest part of the background noise arises from the amplifier, and its elimination could thus be effected by introducing all the attenuation needed between the amplifier and the loudspeaker. This, however, would be impracticable, as the power dissipated would call for resistance elements of gross physical dimensions.

Our own arrangement of the attenuation has proved quite adequate in fulfilling the need for a background noise level which is well below the signal level at normal threshold intensity throughout the test frequency range. With this arrangement, threshold determinations up to 60 decibels above the normal threshold are made by variation of the input attenuator alone, with the output attenuator set at its full attenuation of 40 decibels. For the higher intensity levels the output attenuation is reduced.

Interrupter Switches.—These are operated by hand. We have tried automatically operated switches, whereby it is possible to apply sound stimuli at a uniform rate, free from onset transients. In practice, however, we have seldom found that such transients, which arise from a simple rotatory switch in the output of the amplifier, have any significant disadvantage. Moreover, the use of such a switch simplifies the apparatus, and accordingly facilitates variations by the tester of the interruption rate and duration of the stimuli. Such variations are very important for the avoidance of monotony in the test procedure.

Test Procedure and its Difficulties—1. Management of the Children

Experience has demonstrated the vital importance of the correct management of the children both before and during the test. Careful attention must be paid to the following details.

Preparation

It is essential that the children should not be presented for the test when tired, hungry, or otherwise unfit. They are therefore always seen by appointment after a carefully worded letter of instructions has first been sent to the parents; without such precautions children may be presented in a rather peevish and fretful state, which makes accurate testing impossible.

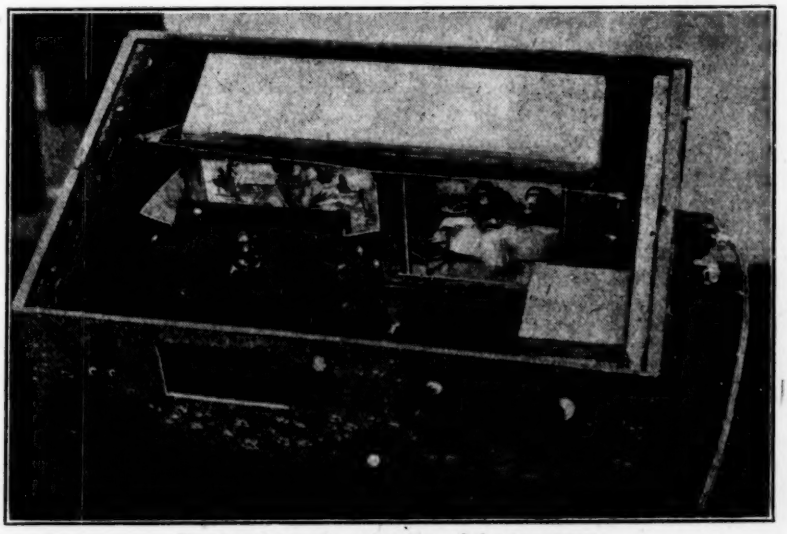


FIG. 4.—Internal mechanism of the apparatus.

Preliminary Interview

This is of great importance. It is a mistake in the course of this interview to attempt any examination of the ears, nose, and throat. Also, the avoidance of white coats by the examiners is of definite assistance in many cases. One examiner plays with the child with a few simple toys on a table, while the second examiner takes the history from the parents. No other spectators should be present at this stage of the interview. In its course, both examiners are able, by observing the child's performance and reactions, to gain some useful impressions both of the state of his intelligence and of his hearing. An electrically operated Klaxon horn is placed behind the child, concealed from him by a screen. This can be operated by one or other of the examiners in the course of the interview and, if heard by the child, nearly always evokes a well-marked reaction which can easily be observed. In the case of a very shy or nervous child rapid co-operation can often be obtained by first allowing him to observe another child playing with the toys.

This interview should not occupy more than 5 to 10 minutes, and it is necessary in its course for the examiners to be convinced, first, that the intelligence of the child is sufficient for the peep-show procedure, and, secondly, that his friendly co-operation has been obtained. The part played in this interview by the examiner in charge of the child, in thus gaining his confidence and introducing him to the test, is certainly a vital one. It is not, however, a very difficult role, and should certainly be within the powers of any intelligent person with a liking for children, given reasonable experience. In the course of this interview it is possible also to pick out certain classes of children who are obviously unsuited for the test, and to recognize certain others who may require special management.

Types of defect which render children unsuitable for the test include:

Mental Defects.—A normal mental age of 3 years is required for the peep-show procedure. The toys and games used in the interview are matched to this level of mental attainment. Any striking inability to manipulate the toys nearly always indicates a mental age of less than 3 years. In such children we always proceed with the peep-show test, but seldom find this possible to carry out.

Visual Defects.—The peep-show procedure is impossible without a visual acuity sufficient for the appreciation of the pictures. This point is carefully checked during the interview.

Motor Defects.—Children with paralysis or severe ataxia may be unable to co-operate in manipulating the press-button switch.

Before proceeding to the test the child's mother is carefully warned of the need to remain quite quiet during the course of the test, and that she should content herself, if referred to by the child, with the adoption of an encouraging demeanour. On no account should she give the child any instruction, in particular "not to touch."

2. Management of the Test

General Considerations.—The intensity regulation of the initial sound stimulus is a matter of some importance. Thus a child with a considerable degree of residual hearing may be disturbed by an initial sound signal of 100 decibels. It is generally possible in the course of the preliminary interview to obtain some indication whether the hearing loss is very slight or very severe, and the initial intensity is regulated accordingly. In general this is set at 80 decibels.

Manipulation of the Pictures.—Once the test is under way and the child has been brought to the point at which he illuminates the picture himself, it is important to allow him sufficient time to inspect it before withdrawing the signal and so eliminating the illumination. The changing of the pictures should be done by the instructor as unobtrusively as possible in order not to deflect the child's interest from the viewing-hatch to the picture-changing mechanism. The frequency with which a picture needs to be changed depends very much on the character of the child. With an attentive or enthusiastic subject the same picture may maintain his interest for some time.

The duration of the test procedure seldom exceeds 12 to 15 minutes. This applies to rather difficult cases and to cases with relatively little hearing loss in which a large number of responses are required. In co-operative children with severe hearing losses the test procedure may be shorter than five minutes.

3. Difficulties

These fall into two main groups: first, difficulties which occur at the start of the test; and, secondly, difficulties which occur in the course of the test.

Difficulties Arising at the Start of the Test

These occur with certain types of children and may make it impossible to get the test procedure under way at all. The types of children concerned may be described under the following headings:

Timid and Apathetic Children.—Most of these appear to be children with an unhappy or unnatural home background. Some had been brought up by foster parents, others in institutions; others, again, appeared to have suffered from the effects of parental severity: all conditions which seemed to have had the effect of destroying natural curiosity and enterprise. The timid children would do nothing without first gaining the approval of the instructor or parent, and great patience and perseverance were needed to elicit in such a child the necessary spontaneous responses. It has often proved most helpful to allow a child of this kind to watch another operating the peep-show. In the apathetic children spontaneous responses occur, but only with sound intensities well above threshold. This is a serious cause of incorrect threshold readings, with exaggeration of the apparent deafness. A failure of interest on the part of the child and a lack of uniformity in his responses generally indicate this difficulty, which may also be accentuated by the use of unsuitable pictures. We have on a few occasions found it necessary to make repeated observations on children of this kind before arriving at a reliable estimate of their deafness, sometimes without the presence of the parents.

The Restless Child.—Certain restless and enterprising children persist, at any rate at the beginning of the test procedure, in pressing the bell-push at random without any signal being given. This situation requires careful management on the part of the tester, who must give the signal at a moment when the child is in an expectant attitude but not apparently preparing to make such a random movement. This is of great importance. Thus, in the case of a deaf child, unable to hear the sound signal, if this is given at a moment which coincides with a random movement the child will be rewarded by seeing the picture. He will not, however, appreciate that this is a reward for a correct response to an audible signal; and, being thus encouraged to indulge in further random movements, will speedily be confused and discouraged from further co-operation. Certain interested children may persist in keeping their finger on or near the button between signals. This, of course, makes observation of the responses very difficult, and must be corrected by removing the child's hand. This must be done gently and with great tact, since in certain cases it appears to discourage the child from further co-operation.

Difficulties During Course of Test

Once the child's spontaneous response to the dual signal has been obtained, the light-shutter is closed and the sound signal is applied alone. Here we reach the crucial part of the test procedure. In favourable cases, and these are the majority, no difficulty arises. The child responds without hesitation to the sound signal and thus leaves the examiners in no doubt that it has been heard. In certain children, however, in whom the preliminary interview has established the likelihood of a fair amount of residual hearing, the

child may give no definite response to the sound signal alone. The difficult situation which then arises may be analysed as follows:

(i) The child hears the sound signal, but for some reason does not understand the need to respond to it in the absence of the light signal. A little experience with the test almost always makes this situation clear. Thus, at the moment of the sound signal the child will nearly always move his hand in an arrested response, or he may look inquiringly at the instructor. Such a movement accurately synchronized with the signal will generally be apparent to the tester on careful scrutiny. If this is detected the child can then be encouraged openly to press the bell-push, when the test generally proceeds without further difficulty.

(ii) Certain children may hear the sound signal but refuse to press the button until they have first satisfied themselves of the coexistence of the synchronized light signal. Such a child will respond at once to the sound signal by first opening the light shutter. On seeing the light he will proceed at once to press the button and illuminate the picture. This sequence of responses does not, of course, invalidate the test, and need not at once be checked.

(iii) Certain children respond very slowly. Indeed, the response to the sound signal may be delayed for as long as 8 to 10 seconds. The cause for this is obscure; nevertheless, this delayed response may occur quite constantly without change of the delay interval, and may be relied upon.

(iv) Certain totally or very severely deaf children may have given a false impression to the examiners at the preliminary interview of having a considerable degree of hearing. Most of these children are highly intelligent, have remarkably good speech, and may be good lip-readers. The faulty assessment of their hearing at the preliminary interview thus occasioned may result in the peep-show procedure being begun with the sound signal of insufficient intensity. Failure to respond on elimination of the light signal may then indicate a degree of deafness which is quite correct but, nevertheless, surprising to the examiners. This situation is met by reverting to the double signal with much higher sound intensities.

4. Procedure After the Test

After completion of the test procedure a detailed examination of the ears, nose, and throat is carried out. The report of our findings, which is finally sent to the appropriate educational authority, comprises information upon the following points: (1) the cause and pathology of the deafness; (2) the prognosis; (3) the possibility of relieving the deafness by means of treatment; (4) the degree and audiometric character of the deafness; and (5) the possibility of alleviating the deafness by means of hearing-aids. Finally, recommendations are made for S.E.T. as fully discussed below.

Our examination findings, taken in conjunction with previous otological reports, have made it clear in most cases that the deafness is due to some neurolabyrinthitis or other irreversible pathological process occurring during gestation or in early post-natal life. In such cases clear advice is given that no treatment is likely to effect improvement and that further deterioration of hearing must eventually be expected. In other children otolaryngological examination may make evident the possibility that the deafness is due, at any rate in part, to some catarrhal otitis likely to be improved by treatment. It is, of course, of the greatest importance to recognize such a cause for the deafness and to advise appropriate surgical treatment—for example, removal of tonsils and adenoids, and insufflation of the Eustachian tubes. When this course is advised it is wise to postpone a final estimate of the deafness and any recommendations relating to S.E.T. until the treatment has been completed and a further audiometric test made. We have observed a number of children of this kind with very severe deafness due in part to an inner ear affection, but with obvious catarrhal changes in the tympana associated with enlarged tonsils and adenoids. Removal of the tonsils and adenoids has in these cases greatly reduced the degree of the deafness and substantially modified the character of S.E.T. recommended.

Clinical Material and Test Results

We have investigated with the peep-show a total of 350 children with a view to determining the possible part played by deafness in the production of backwardness in speech and in other ways. The age distribution of these children was as follows:

Age	No.	Age	No.
2 years	10	5 years	61
3 ,, ...	80	6 ,, ...	44
4 ,, ...	68	Over 6 years ..	87

Of this total, the tests were successful in 302 and unsuccessful in 48. The latter group is discussed first.

Unsuccessful Tests.—The causes of failure are shown in Table I. It will be seen that failure to carry out the tests was attributable in 45 cases to some obvious mental, visual, or motor defect. The three unexplained cases of failure all occurred in our earlier experiences with the peep-show, before the present equipment came into use.

TABLE I

Age Group (Years):	2	3	4	5	6	Over 6	Total
Mentally defective	1	9	13	3	1	8	35
Too young and/or slightly backward	2	3					5
Visual defect: unable to see picture		2		1			3
Paralysis: unable to press button		1					1
Psychological abnormality ..					1		1
Unexplained failure of test ..		2		1			3
Total ..	3	17	13	5	2	8	48

Successful Tests.—In 42 of the 302 cases successfully tested by the peep-show technique it was impossible for a variety of reasons to proceed to recommendations for S.E.T. for backwardness due to deafness alone. Some of the children were in need of preliminary treatment for disorders of the ears, nose, or throat likely to be concerned with their deafness, while others required special management for other defects. These 42 cases are classified in Table II.

TABLE II

Age Group (Years):	3	4	5	6	Over 6	Total
Preliminary treatment needed for ears or nasopharynx	4	6	6	4	2	22
Mentally defective or retarded ..	1	1	3	1	8	14
Epilepsy			1		1	2
Psychologically abnormal			1		1	2
Paralysis					2	2
Total ..	5	7	11	5	14	42

Problems Arising in Connexion with the Making of Recommendations for S.E.T.

In the remaining 260 cases in which the test was successful the question arose of making recommendations for S.E.T. Our chief aim in endeavouring to bring about an improvement in the technique of pure-tone audiometry in these children has, of course, been to establish the pure-tone audiogram as a more efficient basis for such recommendations, and in this we have followed the pioneer work of the Ewings, of Manchester, whose well-known publications constitute a notable landmark in the history of this difficult subject (Ewing, 1930). Due emphasis is also laid upon this point in the report of the committee of the Board of Education, in which it is pointed out that deafness assessment is the most important single factor in determining the character of the S.E.T.

A further passage worthy of quotation appears on page 42 of the committee's report: "The analysis of the acuity of hearing by examination with the pure-tone audiometer forms a scientific basis for the provision of a hearing-aid or the teaching of speech to a child with defective hearing . . . records of the hearing of their children should be available to teachers of Grade II and Grade III children." Our primary aim has been to make such records available to educational authorities after solving the technical difficulties of obtaining them. We have, in addition, extended the scope of our reports in most cases to the making of specific recommendations for S.E.T. on the basis of the committee's well-known classification of deaf children. Here, of course, considerable difficulties have arisen, as the problems involved in the making of such recommendations extend clearly beyond the domain of auditory capacity alone and must ideally include, as duly emphasized in the committee's report, an expert assessment of speech development, vocabulary, mental capacity, lip-reading ability, and a number of other faculties which it is proper to describe as lying beyond our scope.

No great difficulties have been encountered in assessing the mental capacity, and we can certainly say that the behaviour of our subjects, under the conditions of our preliminary interview and during the test itself, has seldom left us in any doubt about the presence or absence of any significant degree of such mental defect. Furthermore, following their recognition by ourselves, such defects have always been confirmed in a subsequent expert examination by a child psychologist. This applies to all of the 49 children specified as mentally defective in the preceding Tables.

In the assessment of speech defects, vocabulary, and lip-reading ability our difficulties have, of course, been much greater. In nearly all of our subjects the speech defects were obvious ones, due, as shown by the clinical history and subsequent audiometry, to a failure of speech development resulting from deafness occurring within the first two to three years of life. We have attempted no precise analysis of its characteristics.

For the purposes of recommendations for S.E.T. our material might be summarized as consisting with few exceptions of children of normal or near normal mental capacity suffering from failure of speech development due to deafness in infancy of which the audiometric characteristics have been reliably determined. We have divided them upon an audiometric basis into groups which correspond fairly closely to those of the well-known classification of deaf children recommended in the report of the committee of the Board of Education (1938).

Our audiometric classification is as follows:

Average Decibel Loss for 1,024 and 2,048 c.p.s.

Group I	.. ..	Less than 30 decibels
" II	.. ..	30–40 "
" III	.. ..	40–80 "
" IV	.. ..	80–100 "
" V	.. ..	Greater than 100 decibels

Groups I, II, IV, and V are discussed first.

Group I.—This corresponds on the whole to Grade I of the Board of Education, with a slightly lower hearing-loss limit—30 instead of 35 decibels. All 17 of these were backward children, and 11 exhibited speech defects attributed to causes other than deafness.

Group II.—This corresponds approximately to the higher audiometric strata of Grade IIA of the Board of Education.

Groups IV and V.—These correspond to the Board of Education's Grade III. In both we emphasize that hearing-aids should be tried. We indicate that these are likely to help in Group IV, but unlikely to help in Group V.

Group III.—This group is an important one—in the first place on account of its size, the total number of subjects being 133. It is important, too, on account of the difficulties of which we have been conscious in accurately assigning all the subjects concerned to one or other of the Board of Education's educational grades. In most cases the amount of the audiometric loss, taken in conjunction with the mental capacity and our very rough estimate of speech development, has made appropriate a provisional assignment to Grade IIB. Our recommendation in these cases has been for education as a partially deaf child in a school where hearing-aids are available. In certain children of our audiometric Group III we have been aware of the possibility that backwardness in speech development, vocabulary, lip-reading, etc., might well necessitate education in a school for the deaf—that is, that their educational grading should be III and not IIB. Such a differentiation, however, has not lain within the scope of our own examination, and we have in these circumstances thought it appropriate to make a provisional recommendation in accordance with the higher grading, IIB.

Results.—The audiometric classification of our material is given in detail in Table III, in which our audiometric grades are set off against the grades of the Board of Education to which they approximately correspond.

TABLE III

Grading and Educational Management of Deaf Children as Recommended by Board of Education* (1938)		Authors' Audiometric Grading	Age Groups (Years) of Subjects						
			2	3	4	5	6	>6	Total
Grade I (decibel loss <35).—Children with defective hearing who can nevertheless without special arrangements of *any kind* obtain proper benefit from the education provided in an ordinary school—elementary, secondary, or technical		Group I (decibel loss <30)	0	1	4	4	4	4	17
Grade II (decibel loss 35–60).—Children whose hearing is defective to such a degree that they require for their education special arrangements or facilities but not the educational methods used for deaf children without naturally acquired speech or language. These facilities range from a favourable position in an ordinary school class-room to attendance at a special class or school	*IIA.*—Those children within Grade II who can make satisfactory progress in ordinary classes in ordinary schools provided they are given some help, whether by way of a favourable position in class, by individual hearing-aids, or by tuition in lip-reading	Group II (decibel loss 30–40)	0	1	4	1	2	6	14
	IIB.—Those children within Grade II who even with the help of a favourable position in the class, individual hearing-aids, or tuition in lip-reading fail to make satisfactory progress in ordinary classes in ordinary schools	Group III (decibel loss 40–80)	1	21	18	28	23	42	133
Grade III (decibel loss >60).—Children whose hearing is so defective and whose speech and language are so little developed that they require education by methods used for deaf children without naturally acquired speech or language. This grade includes the totally deaf		Group IV (decibel loss 80–100)	2	10	6	4	1	8	31
		Group V (decibel loss >100)	4	25	16	8	6	6	65
	Total		7	58	48	45	36	66	260

* The Board of Education was superseded in 1945 by the Ministry of Education. The "ordinary" schools referred to in the report and in the present paper are now known as primary or secondary schools.

Follow-up

With a view to ascertaining the practical value of the peep-show test procedure in prescribing the educational management of these deaf children, we have recently followed up a number of our cases. We selected 40 children whose ages fell into the following groups:

Age	No.	Age	No.
3 years	14	6 years	5
4 ,, ...	11	Over 6 years ..	2
5 ,, ...	8	Total	40

In 35 of these cases it was possible to carry out the test successfully; in five this was impossible. In one the failure of the test was attributed at the time to defective vision due to a congenital cataract which made it impossible for the child to see the picture. In the other four cases the failure was attributed at the time to mental defectiveness, and this diagnosis was confirmed when we came to follow them up. In 33 of the 35 successful cases recommendations for S.E.T. were made as follows:

Group II	1 case
,, III	14 cases
,, IV	4 ,,
,, V	14 ,,

In each of the groups specified above, the intelligence of the children was normal or near normal. The remaining two children were successfully tested but were not recommended for S.E.T. on account of suspected mental defect, later confirmed. In the course of the follow-up, reports were obtained in all 40 cases from the teachers and others in charge of the children's education. The information obtained from this follow-up is set out below under the headings of the four groups, with illustrative case histories. Groups II, IV, and V are considered first.

Group II

The single child in this group had been educated, in accordance with our recommendation, in an ordinary school.

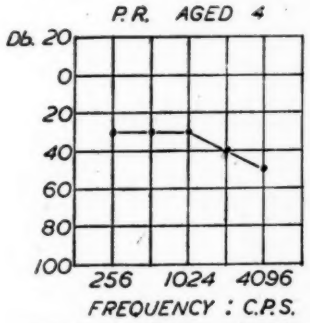


FIG. 5.—Audiogram of P.R.

P. R., a girl aged 4, had been at nursery school for one year. Her teacher thought she was a little deaf since measles six months previously. Examination: Repeated nursery rhymes; intonation fair. Played intelligently; responded to hooter. Ears, nose, and throat healthy. Fig. 5 shows her audiogram. Recommendation: To continue at ordinary school in front row. For retest of hearing in a year's time. *Follow-up:* Recommendation accepted by school M.O. Teacher's report (two years later): "Quite up to standard; no hearing-aid used."

Group IV

In all four children in this group our recommendations for education in a special school for the deaf had been accepted, and in three admission had been secured at the time of the follow-up, with satisfactory reports of progress. In particular, hearing-aids were found to be useful.

J. H., a boy aged 4, began to speak at 16 months but made very little progress after admission to a sanatorium at that age for tuberculous glands. Now responds only to loud voices. Examination: Appeared to have no speech. Played intelligently; responded to hooter. Ears, nose, and throat healthy. His audiogram is shown in Fig. 6.

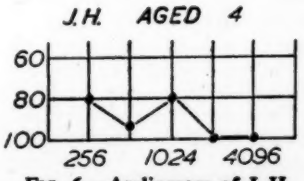


FIG. 6.—Audiogram of J. H.

Recommendation: Special school for severely deaf. Hearing-aid likely to help. Follow-up: School M.O. recommended admission to special unit for deaf children attached to ordinary school. "Medresco" hearing-aid supplied. Teacher's report (one year later): "Makes good use of his remaining hearing. Benefits from hearing-aid; intelligent, and progressing well."

The audiograms of the other three children in Group IV are shown in Fig. 7.

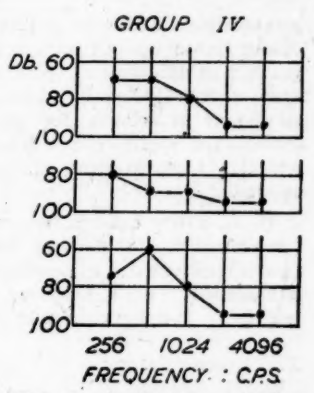


FIG. 7.—Audiograms of other three children in Group IV.

Group V

All 14 children in this group had been educated in accordance with our recommendations in special schools for the deaf. Satisfactory progress was reported by the school authorities in all. In only two was a hearing-aid reported to be of any value.

J. M., a girl aged 4, talked at 14 months. Speech has not progressed since meningitis at 3 years 8 months. Repeats nursery rhymes, etc., but intonation faulty. *Examination:* Would not speak. Played intelligently; no response to hooter. Ears, nose, and throat healthy. Fig. 8 shows her audiogram. Recommendation: Special school for deaf. Hearing-aid unlikely to help. Follow-up: School M.O. recommended admission to day school for partially and totally deaf children where group hearing-aids used. Teacher's report (one year later): "Has settled down very nicely. Remembers a certain amount of language she had before her illness. 'S,' 'N,' and 'T' sounds are missing. Lip-reading very good. Hears nothing with amplifier."

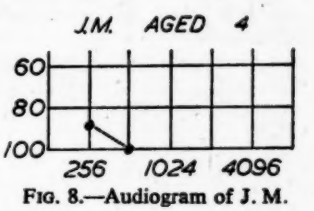


FIG. 8.—Audiogram of J. M.

In addition to J. M., seven other subjects in Group V had some residual hearing. Their audiograms are given in Fig. 9.

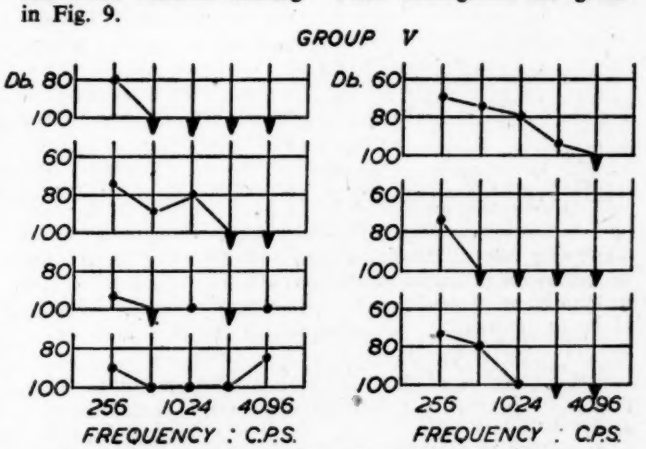


FIG. 9.—Audiograms of seven other children in Group V.

Group III

All of the 14 children in this group had been recommended by ourselves for education as partially deaf children, in accordance with a Board of Education grading of IIB.

In three cases the school M.O.s had preferred an educational grading of IIA and in two others a grading of III. In all five of these subjects the appropriate educational

arrangements had been in force for some time at the period of our follow-up. In the other nine subjects our educational grading of IIB was accepted by the school M.O.s. At the time of the follow-up, however, five were still awaiting admission to schools for the partially deaf, and four of these were meanwhile continuing attendance at ordinary schools. Case histories of three subjects in Group III are appended.

M. R., a boy aged 3, had meningitis at 13 months. Says "mummy" and "daddy," but little else. Mother thinks he is slightly deaf. *Examination:* Would not speak. Played intelligently. Brisk response to hooter. Nose and throat healthy. Tympanic membranes dull and retracted. His audiogram is shown in Fig. 10. Recommendation: Special school for partially deaf, hearing-aid to be used. Follow-up: School M.O. recommended tuition with hearing-aid by teacher of deaf. Case reviewed two months later, when progress justified recommendation for education in ordinary school. To sit in front row and use aid. Report of teacher of deaf: "With hearing-aid after nine months could repeat three-word phrases perfectly. Now wears aid whole of working hours unless playing rough game. Hope he will attend partially deaf unit when 5."

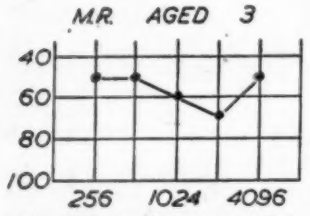


FIG. 10.—Audiogram of M. R.

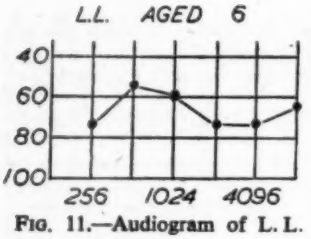


FIG. 11.—Audiogram of L. L.

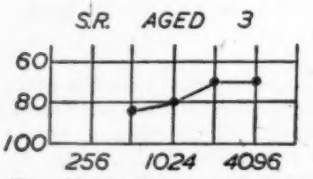


FIG. 12.—Audiogram of S. R.

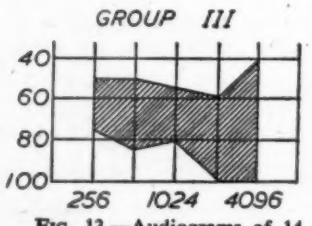


FIG. 13.—Audiograms of 14 children in Group III, lying within the shaded area.

L. L., a girl aged 6, had measles at 2 years. Talked very late. Articulation poor. At school one year. Teacher and mother think she is a little deaf. Examination: Intonation poor. Played intelligently. Responded to hooter. Ears, nose, and throat healthy. Fig. 11 shows her audiogram. Recommendation: Special school for partially deaf. Hearing-aid to be used. Follow-up: School M.O. accepted recommendation. Medresco aid supplied. To continue at ordinary school while awaiting admission. Teacher's report 16 months later: "Progress in past nine months largely due to quickness in imitating child sitting next to her. Good at manual work and knitting. Can hear story only if very close to teacher." Mother reported that the hearing-aid was very useful at school.

S. R., a girl aged 3. Maternal rubella second to third month of pregnancy. Babbles constantly. Says "mum" and "no"; no other words. Mother does not think she is deaf. *Examination:* No speech. Very shy, but played intelligently. Responded to hooter. Ears, nose, and throat healthy. Fig. 12 shows her audiogram. *Recommendation:* Special school for partially deaf. Hearing-aid to be used. *Follow-up:* School M.O. recommended school for deaf. Medresco aid supplied. Teacher's report (two years later): "Too severely deaf to be taught language except as deaf child. Benefits from aid. Very strong voice. Lip-reading better than speech. Progress satisfactory."

The audiograms of the 14 children in Group III lie within the shaded area in Fig. 13. In 9 of these cases Medresco aids had been supplied and were reported as useful. In two cases no aid had yet been tried. Of the remaining three cases, in which an aid had been tried without benefit, two of the subjects were mentally backward in addition to their deafness and could not manage the aid for this reason, while the third had recently been supplied with spectacles and found both devices too much to manage.

Discussion

The results of our investigation call for particular consideration under the following headings: (1) the accuracy of the audiometric test results; (2) the practical relationship between these test results and the ability of the subjects to understand connected speech; and (3) the validity and practical value of educational recommendations made upon the basis of our examination findings, of which the most important is the pure-tone audiogram.

Accuracy of the Audiometric Test Results

The most convincing evidence of the accuracy of the test results is that which we have derived as examiners from our personal observations of the several hundred children whom we have had the opportunity of observing during the course of the tests, in particular the alacrity of their responses and the repeatability of the threshold values. It has also been possible in a few children to carry out pure-tone audiograms by means of conventional audiometer tests in addition to the peep-show test. In these cases we have found that the peep-show readings give results which correspond very closely to the readings obtained for the better ear with the conventional audiometer. Fig. 14 shows the pure-tone audiogram and peep-show test results in a particularly co-operative child aged 5.

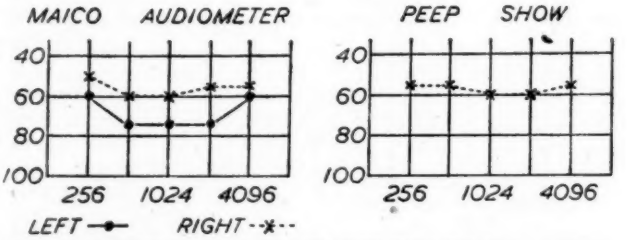


FIG. 14.—Pure-tone audiogram and peep-show test in a co-operative child aged 5.

Some comment is perhaps called for upon the fact that with the peep-show audiogram we have contented ourselves with a measurement of binaural hearing capacity. This we have done, as it is the unaided hearing capacity which determines the child's disability and therefore the character of the S.E.T. required. Furthermore, the conditions of our examination make impossible the extra expenditure of time which would be needed for the separate testing of the two ears. It is, of course, helpful to have this additional information, particularly when hearing-aids are to be used, and a modification of the peep-show procedure which makes this possible has recently been described by Denmark (1950). Telephone receivers were employed, and the procedure was used for deaf subjects in the Liverpool School for the Partially Deaf, where more time is available for the examination than is possible under the conditions of our own tests.

It is necessary also to add that, given particularly favourable circumstances—that is, opportunity for prolonged or repeated examinations with particularly co-operative or intelligent children—it is often possible in children under the age of 6 years to obtain very serviceable pure-tone audiograms by means of the conventional pure-tone audiometric procedure, using telephone receivers. Such conditions, however, rarely occur in our own clinic.

Relationship Between the Pure-tone Audiogram and Hearing Capacity for the Conversational Voice

The problem involved here is a well-known one and needs to be considered in relation to the pathology of the deafening disease. Dix, Hallpike, and Hood (1949) discuss the matter in some detail and give results of pure-tone and speech audiometric tests carried out in a large number of adult subjects suffering from a variety of deafening diseases. The conclusions reached may be stated as follows: that in the case of simple conductive deafness—that is to say, due to disease of the conducting mechanism of the ear, in particular the middle ear—pure-tone audiometric losses are related to the hearing loss for connected speech in the comparatively simple manner which was fully described in our previous paper (Dix and Hallpike, 1947).

When, however, the deafness is of the so-called perceptive type, arising from disease of the inner ear or cochlear nervous pathways, the relationship of the pure-tone audiometric loss to the hearing capacity for speech is more obscure; in general the latter is likely to be greater than that predictable from the pure-tone audiogram.

The term "perceptive deafness," however, is a comprehensive one and includes a variety of pathological processes affecting quite different nervous elements of the cochlear mechanism, and in other papers (Dix, Hallpike, and Hood, 1948; Dix and Hallpike, 1950) it has been shown that failure of speech comprehension is a particular characteristic of perceptive deafness due to disease processes affecting the hair cells of Corti's organ. On the other hand, in perceptive deafness due to lesions affecting the fibres of the eighth nerve or the physical constitution of the fluids of the inner ear speech comprehension may be relatively good and is much assisted by hearing-aids as in the case of conductive deafness due to middle-ear lesions. It is quite clear, therefore, that the practical relationship between the pure-tone audiogram and hearing capacity for speech cannot be discussed intelligently without reference to the pathological processes concerned.

In the case of young children much less can be said of the pathological processes responsible for deafness, as in very few of them is it possible to carry out reliable bone-conduction tests, still less up-to-date investigations such as loudness recruitment tests, upon which we have come to rely as a diagnostic index of active hair-cell disease. There is, however, a good deal of collateral evidence that in many of our own subjects the deafness has been due to some affection of the inner ear and eighth nerve—that is, a neuro-labyrinthitis occurring during gestation or early post-natal life. While hair-cell damage is known to be one of the features of the pathological processes involved, other features, such as cochlear-nerve degeneration and physical changes in the labyrinthine fluids, are also known to occur, and it seems to us that these latter factors are likely, at any rate in part, to be the cause of the residual deafness which was present at the time of our examination. Certainly it must be said that tinnitus, which is a particular feature of active hair-cell disease, is not as a rule complained of by deaf children. For these reasons, therefore, it seems unwise to assume for the present that the perceptive deafness of children is necessarily of the so-called uncompensated type in which hearing for the conversational voice is relatively bad, unrelated to the pure-tone audiogram, and difficult to correct by means of hearing-aids.

It is hoped to make the pathological processes involved in the deafness of children the subject of a further communication.

Validity and Practical Value of the Educational Recommendations

The evidence obtained from our follow-up, although not comprehensive in view of the small number of subjects involved, nevertheless provides good support for the validity of our educational recommendations in respect particularly of Groups IV and V. Some difficulty has arisen in the case of the 14 subjects comprising our Group III, in only nine of whom had it been found advisable to accept our recommendation for an educational grading of IIB. In the case of the remaining five subjects an educational grading of III had been preferred, mainly on account of severe speech defects, and it seems necessary to say that in this group pure-tone audiometric findings need to be reinforced for the purpose of educational recommendations by a more elaborate evaluation of speech development than anything we have attempted. It may be supposed that such an examination might ideally be carried out by a competent authority—for example, a teacher of the deaf—as an immediate complement to our own examination of the hearing, and of the ears, nose, and throat. Here, however, certain difficulties arise, and much must obviously depend upon the practical circumstances of the case. It would appear, for instance, that in many subjects a final assessment of suitability, particularly in respect of speech development, etc., can best be made by the headmasters of the special schools for which the children are recommended.

If this be the case, and if these headmasters require such interviews as a matter of routine for the purpose of making assessments, then it would seem that provisional recommendations for S.E.T. made upon the basis which we adopted have much to be said for them, provided always that the error rate involved is as low as that shown by our follow-up.

In other respects the aims of our examination procedure would seem to be satisfactory, as also the claim that can be made for its results—namely, that it is possible, by its means as perhaps by no other, to put at the disposal of the educational authorities concerned information upon the causes and character of the deafness, in particular the pure-tone audiogram, which must continue to provide in their hands an essential basis for the educational treatment of deaf children.

Summary

In a previous communication (Dix and Hallpike, 1947) a description was given of the peep-show equipment and its use in the diagnosis of deafness in young children. The advantages of the equipment are summarized again as follows: (1) Pure-tone audiograms greatly facilitate the making of recommendations for S.E.T. in deaf children. They are obtainable by means of the peep-show procedure in nearly all subjects of normal intelligence within the age group 3 to 6 years. (2) The test is carried out rapidly and nearly always in the course of a single interview. The length of the examination, including a preliminary interview for case-taking, seldom exceeds half an hour. (3) The technique is simple and does not require long or difficult training on the part of the examiners. (4) Stress is laid upon the well-known practical advantage of the pure-tone audiogram in facilitating subsequent observations upon the progress of the deafness. (5) The examination provides a useful measure of the subject's mental capacity.

These claims have been substantiated by tests carried out in the course of the past four years on some 350 cases. In the course of this work certain improvements have been made in the mechanism of the equipment, and a full description of these improvements is given.

Certain technical and psychological difficulties which may arise during the testing procedure are discussed. Particulars are given of the means we have found most effective for overcoming these difficulties.

The results obtained in 350 cases are described. In 260 of these, educational recommendations were made upon the basis of the pure-tone audiometric findings. For this purpose we have employed a classification based

upon the audiometric findings which is closely related to the educational grading of deaf children prescribed by the Ministry of Education.

The validity of the audiometric findings and of the educational recommendations based thereon was investigated in the course of a follow-up of 40 children, the results of which are described and discussed.

Consideration is also given to the relationship between the pure-tone audiogram and the hearing capacity for the spoken voice. Emphasis is laid upon the fact that this relationship depends essentially upon the pathology of the deafening disease.

It seems justifiable to assume that in the majority of deaf children pure-tone audiometry provides a useful measure of hearing capacity for speech.

It is a pleasure to acknowledge the great help that we have received in the course of this work from a number of our colleagues. Dr. J. L. Dunlop, county medical officer, Hertfordshire, and Mr. Henry Sharp, aural surgeon, Hospital for Sick Children, Great Ormond Street, have referred many patients to us for examination. Mr. R. Bolam, of the staff of the Otological Research Unit, devised and constructed the mechanism of the present peep-show, which has now stood the test of several years' hard work. Mr. Bernard Adams kindly designed and executed the decorations. Miss A. E. Young, aural almoner, Hospital for Sick Children, and many teachers of the deaf and other school authorities have all rendered great assistance. Finally, Dr. J. L. Burn, medical officer of health, Salford. Mr. Terence Cawthorne, and Dr. J. E. A. Underwood of the Ministry of Education, have all read the manuscript and made valuable suggestions.

The peep-show equipment has been constructed by Marconi Instruments, Ltd., upon the basis of our specifications and was recently put on the market by them.

REFERENCES

Board of Education (1938). *Report of the Committee of Inquiry into Problems Relating to Children with Defective Hearing.* H.M.S.O., London.
Denmark, Frank G. W. (1950). *J. Laryng.*, **64**, 357.
Dix, M. R., and Hallpike, C. S. (1947). *British Medical Journal*, **2**, 719.
—— —— (1950). *Proc. roy. Soc. Med.*, **43**, 291.
—— —— and Hood, J. D. (1948). Ibid., **41**, 516.
—— —— —— (1949). Ibid., **42**, 527.
Ewing, A. W. G. (1930). *Aphasia in Children.* Oxford University Press, London.

Rabies incidence has been declining steadily in Israel since the start of the intensive nation-wide campaign in October, 1950, according to Dr. Martin M. Kaplan, chief veterinary officer of the World Health Organization, who recently returned from a visit to that country. The Israel anti-rabies campaign, which is being waged with the assistance of W.H.O., includes, among other measures, a mass vaccination of dogs with a new vaccine which has proved harmless to them and seems to give a greater immunity of longer duration than other vaccines so far produced. The number of rabies cases in animals has dropped from an average of 100 a year before the start of the campaign to 10 (one bull, one jackal, and eight unvaccinated dogs) in the course of the past 15 months. All dogs in Israel have been registered, and vaccinated animals have received suitable identification. All stray dogs are being destroyed, while newborn animals are vaccinated when they reach 6 months of age. Vaccination is compulsory and free of charge. Although it is still too early to determine to what extent vaccination alone has brought about the fall in rabies incidence in animals, Dr. Kaplan believes that the concentrated attack has played an important part in this matter. The drop is mirrored also in the decline in human deaths from rabies, which were none in 1951, whereas they numbered 20 between 1948 and 1950. In addition the number of people receiving Pasteur treatments following dog bites, which averaged 4,000 a year before the start of the campaign, has been cut to about one-half.

HABITUAL ABORTION

FURTHER OBSERVATIONS ON THE PROPHYLACTIC VALUE OF PROGESTERONE PELLET IMPLANTATION

BY

P. M. F. BISHOP, D.M., M.R.C.P.

Endocrinologist to Guy's Hospital and Chelsea Hospital for Women, and to the Department of Obstetrics and Gynaecology, Postgraduate Medical School of London

AND

N. A. RICHARDS, M.D., M.R.C.O.G.

Chief Assistant, Chelsea Hospital for Women

Recently we (Bishop and Richards, 1950) reported on a series of 45 patients with a history of habitual abortion who had received an implant of progesterone during the pregnancy under consideration. The results, which are shown in Table I, were commented upon by Dr. Richard Doll as follows: "Provided the 'normal'

TABLE I.—*Results of First Series (45 Cases)*

No. of Successive Abortions Immediately Preceding the Treated Pregnancy	No. of Patients	Outcome of Treated Pregnancy		Percentage Successful Results
		Success	Failure	
A. Primary Habitual Abortion				
2	20	18	2	90
3	8	7	1	88
4 or more	5	3	2	60
B. Secondary Habitual Abortion				
2	8	6	2	75
3	1	1	0	100
4 or more	3	3	0	
C. Primary and Secondary Habitual Abortion Combined				
2	28	24	4	86
3	9	8	1	89
4 or more	8	6	2	75

incidence of spontaneous abortion is of the order of 10% and the incidence of abortion due to recurrent factors is not much less than 0.1%, it is reasonable to conclude that the present figures indicate an effect of treatment. Should, however, the true incidence of 'recurring' abortion be of the order of 0.01%, the present results could easily be attributed to chance."

The Biological and Medical Committee of the Royal Commission on Population (1949) concluded that "the proportion of all pregnancies ending in spontaneous abortion may be placed between the relatively narrow limits of 7 and 11%." Javert (1948), analysing 56,803 pregnancies, found the incidence of primary habitual abortion—that is, three or more consecutive spontaneous abortions beginning with the first pregnancy—to be 0.3% and the incidence of secondary habitual abortion to be 0.2%. Malpas (1938), studying about 6,000 pregnancies, found the incidence to be 1.4%, and Bishop (1937), analysing 2,687 case histories from the Guy's Hospital Maternity Service, found that 0.4% of women had more than one initial idiopathic abortion at less than five months, and that 0.1% had three initial idiopathic abortions. Since the publication of our paper, Ripman (1951) has analysed 2,474 case histories from the Guy's Hospital Maternity Service and has excluded the last recorded pregnancies in order to diminish the error due to incomplete information concerning these last pregnancies. He has found an overall abortion rate

of 10.5%, but there were not enough cases in the series to provide evidence of the incidence of, or the prognosis in, "habitual abortion."

The results of our first series of 45 cases were open to the criticism that there were only 13 cases of primary habitual abortion and four cases of secondary habitual abortion, with three or more previous abortions, which had been treated with pellet implantation, and, although in 14 (82%) of these treatment had been successful, this represented a rather small series upon which to base any firm conclusions. For this reason we have now analysed a further series of 40 cases.

Material

This series represents *all* the cases coming under our definition of "habitual abortion" treated by us with progesterone pellet implantation at Chelsea Hospital for Women since June, 1950, with the exception of five cases, discussed in detail below. Direct information concerning the outcome of the treated pregnancy was obtained in each of these cases.

We have defined "habitual abortion" as "idiopathic" abortion before the end of the fifth month of pregnancy occurring on two or more consecutive occasions immediately preceding the pregnancy in which pellet implantation has been used. Abortion is regarded as "idiopathic" if no recognized organic cause has been found. "Primary" habitual abortion refers to the condition in which all previous pregnancies have resulted in abortion. "Secondary" habitual abortion indicates that one or more previous pregnancies have proceeded beyond the 28th week.

The implantation was carried out as early in pregnancy as possible, in many cases as soon as the pregnancy test was positive or symptoms as well as a missed period made it reasonably certain that the patient was pregnant. The majority of patients received implants before the eighth week and almost all of them before the 10th week. Six 25-mg. pellets of progesterone were introduced beneath the deep fascia of the thigh by means of a trocar and cannula by the technique previously described (Bishop, 1949). No other treatment or precautionary regime was prescribed.

Results

TABLE II.—*Results of Present Series (40 Cases)*

No. of Successive Abortions Immediately Preceding the Treated Pregnancy	No. of Patients	Outcome of Treated Pregnancy		Percentage Successful Results
		Success	Failure	
A. Primary Habitual Abortion				
2	16	14	2	88
3	6	4	2	67
4 or more	6	3	3	50
B. Secondary Habitual Abortion				
2	9	7	2	78
3	2	1	1	67
4 or more	1 (6 miscarriages)	1	0	

A successful result is defined as one in which the pregnancy proceeded to 28 weeks, but in this series all the patients "successfully" treated, in fact, had live babies. One of the patients treated for primary habitual abortion who had had four or more previous abortions, and whose current pregnancy was unsuccessfully treated with progesterone-pellet implantation, had had more than 15 miscarriages. On the other hand, the successfully treated case of secondary habitual abortion with four or more previous abortions had actually had six sequential miscarriages since her previous full-term pregnancy.

Cases Not Included in the Series

One patient had had an eight-weeks miscarriage in July, 1939. In January, 1944, she had a full-term normal delivery, having been treated with progesterone injections during this pregnancy. In August, 1945, there was an abortion at just over four months, and in March, 1946, a miscarriage occurred at six weeks. In both these pregnancies progesterone was administered by injection. In August, 1949, a live child was born following a pregnancy in which a progesterone implant was carried out by us at Chelsea Hospital for Women. The case was therefore included in our previous series. Since then the patient has had another live child, born in July, 1951, after a pregnancy which was again treated with an implant. Because of the previous successful pregnancy this case no longer falls under our definition of "secondary habitual abortion."

Four other cases are not included in this series because in each case the pregnancy immediately preceding that under consideration was one in which a progesterone implant had been administered, the pregnancy proceeding to a successful termination.

The following Table gives the combined results of the two series:

TABLE III.—*Combined Results (85 Cases)*

No. of Successive Abortions Immediately Preceding the Treated Pregnancy	No. of Patients	Outcome of Treated Pregnancy		Percentage Successful Results
		Success	Failure	
2	53	45	8	85
3	17	13	4	76 } 72
4 or more	15	10	5	67 }

Discussion

The calculations most often quoted in estimating the "spontaneous cure rate" are those of Malpas (1938) and Eastman (1947). These are shown in Tables IV and V.

TABLE IV.—*Malpas's Figures*

No. of Previous Abortions	Spontaneous Cure Rate of a Subsequent Pregnancy
1	50 to 78%
2	9 „ 62%
3	7 „ 27%
4	0·3 „ 6%

TABLE V.—*Eastman's Figures*

No. of Cases	Previous Abortion	Will Abort from Accidental Causes	Will Abort from Recurrent Causes	Total Abortions	% Will Abort	Spontaneous Cure Rate
100,000	0	9,600	400	10,000	10·0	—
10,000	1	922 (9·6% of above figure)	400 (same 400)	1,322	13·2	86·8
1,322	2	88 (9·6% of above figure)	400 (same 400)	488	36·9	63·1
488	3	8 (9·6% of above figure)	400 (same 400)	408	83·6	16·4

It will be seen that our proportion of successful results for patients with a history of two previous abortions is 85%, whereas the spontaneous cure rate of Malpas and Eastman is in the region of 63%. It is, however, in groups in which three or more previous abortions have been recorded that the true definition of "habitual abortion" operates. Malpas calculates the expected spontaneous cure rate for three previous abortions at 7 to 27%, and for four at 0.3 to 6%. Eastman calculates the spontaneous cure rate for three previous abortions at 16%. Our figures for three previous abortions are 76%, and for more than three previous abortions 67%. The combined figure for a series of 32 treated cases having had three or more previous abortions is 72% successful results. This is significantly greater than the calculations of Malpas and Eastman. It is of the same order as the results of Smith (1948), who reported 60 patients with a history of three, four, or five previous abortions, of whom 46 (77%) were successfully treated with stilboestrol in doses increasing from 5 mg. daily at the sixth week to

115 mg. daily at the 35th week. We suggested in our previous paper that the essential therapeutic mechanism may have been the same in our series of cases as in that of Smith—namely, that we were providing extrinsically the progesterone which was intrinsically lacking in these cases of early habitual abortion, whereas Smith was stimulating, by means of extrinsically administered oestrogen, the secretion of placental hormones and especially progesterone.

It may be observed that the dose of progesterone administered by implantation appears to be small. It has not been easy to determine the rate of absorption of implanted progesterone, because the pellets are apt to extrude if implanted superficially. Bishop and Folley (1951) were able to study the rate of absorption of only four pellets of 50 mg. of progesterone implanted in female patients, and found that 40% of each pellet was absorbed in just over 40 days. This indicates, for what it is worth, that progesterone is one of the more rapidly absorbed hormones when administered by pellet implantation. Calculating from the findings of Bishop and Folley, we think it probable that the long cylindrical-shaped 25-mg. pellet which we have been using is fairly rapidly absorbed and may not remain effective for more than about a month. Nevertheless, if these early habitual abortions are due to a progesterone deficiency which operates during the second and third months of pregnancy, possibly by leading to an inadequate decidual reaction which endangers the safe embedding of the early ovum, administration of a constant though transient exogenous supply of progesterone by implantation may carry the patient over the critical period when abortion is mostly likely to occur.

One is of course always conscious of the possibility that the particular pregnancy under consideration may have gone to term without therapeutic aid. It is for this reason that we sought statistical advice both in regard to our original series and in respect of the present series. (Dr. Doll again is of the opinion that our results are of significance provided that the incidence of true habitual abortion is not much less than 0.1%.) One cannot, however, altogether exclude the psychological factor. Many habitual aborters and their husbands or relatives are highly strung and need reassurance that all will be well in the present pregnancy. Possibly the psychotherapeutic effect of an implant, as opposed to a series of injections or tablets by mouth, may in some cases supply the necessary confidence to enable the patient to retain the embryo during those early critical days.

Bevis (1951) has studied a series of 32 cases of habitual abortion (three or more previous abortions), of which 26 (81%) gave birth to live children. These patients received no treatment which we would regard as effective, though they were advised to rest at the time the menses would have been due. They were, however, submitted to elaborate investigation, including glucose-tolerance tests, estimation of basal metabolic rate, and fortnightly estimation of urinary pregnanediol. It is true that some of Bevis's cases did not come under observation until the 12th week of pregnancy—that is, when the early abortion hazard had been overcome. Nevertheless, if one is to accept his results at their face value—and we are in no position to say that one should not—and if one is also to agree with the calculations of Eastman and Malpas, one must logically conclude that 81 minus 16%—namely, 65%—of patients who have experienced more than three early abortions have done so for psychological reasons and that any procedure which is likely to gain their confidence may well prove successful. There is of course an obvious way of settling the question whether a progesterone implant is endocrinologically or merely psychologically therapeutic—namely, to treat alternate cases with implants of progesterone and an inert compound such as cholesterol.

We would, however, repeat the observation which we made in our first paper, that our results do not indicate that progesterone-pellet implantation in the dosage used is harmful in cases of habitual abortion.

Summary

A further series of 40 cases with a history of two or more miscarriages before the end of the fifth month of pregnancy, immediately preceding the treated pregnancy, were given an implantation of six 25-mg. pellets of progesterone.

Previously a series of 45 cases was reported upon. From this combined series of 85 cases 32 patients had experienced at least three miscarriages occurring before the end of the fifth month of pregnancy. Twenty-three patients (72%) produced live children during the current pregnancy in which the progesterone-pellet implantation was performed. This represents a significantly higher success rate than that expected from the calculations of Malpas and Eastman.

The results of Bevis (80% success rate with three or more previous miscarriages) in patients who received no effective endocrine therapy but were submitted to a series of elaborate investigations are discussed in the light of the possible psychotherapeutic effect of any procedure likely to gain the patient's confidence.

We should like to record our thanks to Dr. Richard Doll, of the Statistical Research Unit, Medical Research Council, for his interest and comments on this series of cases, and to members of the staff of Chelsea Hospital for Women and to other gynaecologists and doctors who have referred the patients in this series to us for implantation.

REFERENCES

Bevis, D. C. A. (1951). *Lancet*, **2**, 207.
Bishop, P. M. F. (1937). *Guy's Hosp. Rep.*, **87**, 362.
—— (1949). *Practitioner*, **163**, 437.
—— and Richards, N. A. (1950). *British Medical Journal*, **2**, 130.
—— and Folley, S. J. (1951). *Lancet*, **2**, 229.
Eastman, N. J. (1947). In J. V. Meigs and S. H. Sturgis's *Progress in Gynaecology*, p. 262. Heinemann, London.
Javert, C. T. (1948). *N.Y. St. J. Med.*, **48**, 2595.
Malpas, P. (1938). *J. Obstet. Gynaec. Brit. Emp.*, **45**, 932.
Papers of the Royal Commission on Population (1949). Vol. IV, Reports of the Biological and Medical Committee, p. 4. H.M.S.O., London.
Ripman, H. A. (1951). *Guy's Hosp. Rep.*, **100**, 121.
Smith, O. W. (1948). *Amer. J. Obstet. Gynec.*, **56**, 821.

ACUTE POLYARTHRITIS WITH PULMONARY CONSOLIDATION AND PLEURAL EFFUSION

BY

A. W. LEES, M.D., F.R.F.P.S., M.R.C.P.Ed., D.P.H.

Although numerous examples of "rheumatic pneumonia" and "rheumatic pleurisy" have been recorded, many observers are sceptical of the specific nature of these conditions, chiefly because in most reported cases severe cardiac damage has been present. The following cases are of interest because, although the probable diagnosis was acute rheumatism with pulmonary manifestations, no evidence of cardiac involvement could be detected, although eventually a mitral systolic murmur appeared in one.

Case 1

A man aged 37 was admitted to hospital on July 1, 1950, because of a rapid deterioration in his general condition. Fourteen days before admission his knee-joints had become painful, red, and swollen, and later his ankle-joints, wrists, interphalangeal joints, elbow-joints, and shoulder-joints became similarly affected. His health had been good until December, 1949, when he had rheumatic fever; he made a complete recovery and resumed work in February, 1950. His mother, aged 67, was crippled with rheumatoid arthritis.

On admission the wrists, interphalangeal joints, knees, and ankles were red, swollen, and extremely painful and tender, and the shoulder-joints and elbows were painful on movement. The skin was warm and moist. The patient appeared gravely ill; his colour was ashy-blue, he was slightly dyspnoeic at rest, and he had an anxious expression. His temperature was 100.4° F. (38° C.), pulse 108, and respirations 22. Over the lower lobe of the left lung the percussion note was dull, the respiratory murmur bronchial and loud, and the vocal resonance increased. Numerous medium moist crepitations could be heard over the left lower lobe. Clinical and electrocardiographic examination revealed no significant cardiac involvement at any stage. His general condition began to improve on July 5. A chest radiograph on July 7 revealed left basal consolidation with overlying pleural thickening or a small effusion. The heart was of normal size. Aspiration on July 10 produced 60 ml. of a sterile, straw-coloured fluid containing roughly equal numbers of polymorphs and lymphocytes; no tubercle bacilli were found on direct examination, culture, or guinea-pig inoculation. Signs of consolidation in the left lower lobe began to disappear on July 12, and a radiograph on the 14th showed that the condition had almost cleared up; crepitations were present, however, until August 11. Cough was slight throughout, and was always non-productive of sputum.

Calcium aspirin, 150 gr. (10 g.) daily, was given from July 1 to 9, but, although it relieved joint pains, the temperature did not settle, varying between 97 and 103° F. (36.1 and 39.4° C.). Penicillin, 600,000 units daily, was started on July 9, and the temperature, which had fallen on the previous day, settled, although there were subsequent minor elevations. Penicillin was stopped on July 18. After stopping the aspirin on July 9 the joints again became swollen and painful, and it was reinstituted on July 12, with marked benefit; it was finally discontinued on September 27. Blood examination on July 4 showed: R.B.C., 5,500,000; Hb, 90%; W.B.C., 7,000 (polymorphs 82%, lymphocytes 18%); no malaria parasites; and on July 8: W.B.C., 6,500 (polymorphs 78%, lymphocytes 20%, monocytes 2%); no malaria parasites. Blood cultures on July 10, 11, and 13 were negative.

A throat swab on July 6 was negative for *B. diphtheriae* and haemolytic streptococci; there was a predominant growth of *Str. viridans* and a light growth of pneumococci. Serological tests on serum taken on July 13 were negative for typhoid fever, paratyphoid A and B, brucellosis, and typhus. Serum taken on August 29 was tested at Colindale Virus Reference Laboratory; complement-fixation tests for influenza A and B, Q fever, and the psittacosis-L.G.V. (lymphogranuloma venereum) group were negative, and there was no significant agglutination of *Streptococcus M.G.* or significant titre of cold agglutinins. W.R. and gonococcal complement-fixation tests on July 6 were negative. The erythrocyte sedimentation rate (E.S.R.) on July 4 was 114 mm. in the first hour and 120 mm. in the second hour (Westergren method). The corresponding rates on July 10, 13, 24, and August 14 were 108 and 118, 90 and 98, 15 and 38, and 8 and 18 mm., respectively. A bronchogram on August 17 showed a normal left bronchial tree. The patient was discharged on October 14. He was well apart from occasional stiffness of the ankle-joints after exercise.

Comment.—The general aspect of the patient—cyanotic, dyspnoeic, and anxious, coupled with the arthritis—suggested bronchial carcinoma with mediastinal compression and joint manifestations, but the course of the illness ruled this out. Woodland (1947) and others have described cases of pulmonary tuberculosis with associated arthritis, but the clinical features made this diagnosis untenable, and investigation of the pleural fluid revealed no evidence of tuberculosis. There was no cough, sputum, pain in the side, or polymorphonuclear leucocytosis as in bacterial pneumonia. Because of the persistent crepitations at the left base an acute exacerbation of a mild bronchiectasis was considered in spite of the absence of a suggestive previous history, but bronchography showed a normal bronchial tree. Serological investigations did not incriminate any of the virus or rickettsial groups tested. Certain fungi, especially coccidioidomycosis, may cause pulmonary lesions and arthritis; in endemic areas skin tests with specific antigen and complement-fixation tests are of diagnostic value, but they were not considered necessary in the present case. High antistreptolysin titres have been noted in rheumatic fever (Boisvert, 1940; Bunim and McEwen, 1940) and a rising titre of antistreptolysin is reported by some as of diagnostic value. Antistreptolysin titres were not ascertained in this case. The final diagnosis was acute rheumatism with rheumatic "pneumonia" and pleural effusion.

Case 2

An obese male schoolteacher aged 42 was admitted to hospital on March 1, 1951, with a diagnosis of acute rheumatism. Eight days before admission he felt "shivery" and experienced a sensation of stiffness in the shoulders, elbows, wrists, and right knee. The right knee subsequently became swollen and painful.

On admission his temperature was 98.4° F. (36.9° C.), pulse 90, and respirations 30. His blood pressure was 150/90. Examination revealed limitation of movement of the right hip and left elbow and shoulder, and reddening and tenderness over the first left metacarpo-phalangeal joint. The patient's mental state was peculiar; he prattled childishly in answer to questions, described past trifling ailments in great detail, and claimed that he was unable to sit up or move in bed. No evidence of organic disease of the nervous system could be found. Apart from the above findings, examination was essentially negative. The temperature rose to 100° F. (37.8° C.) on March 2 and remained elevated and swinging. There was profuse sweating. Blood examinations on March 2, 5, and 12 showed: W.B.C., 12,000–20,000; 90% polymorphs. Lumbar puncture on March 5 produced a clear fluid not under pressure; cells 2 per c.mm.; total protein, 26.4 mg. per 100 ml.; sugar, 65 mg. per 100 ml.

On March 8 numerous crepitations were heard over the left lower lobe and the percussion note was impaired. There was a slight productive cough, and culture of sputum yielded a moderate growth of *Staph. albus* and *Str. viridans.* A chest film on the same day was reported as showing left lower lobe consolidation. The appearances suggested that there might also be some overlying fluid, and although the physical signs indicated only consolidation, aspiration on March 12 produced half a pint (284 ml.) of straw-coloured fluid from the left thorax.

By March 21 crepitations could no longer be heard over the left lower lobe and the percussion note was resonant over the left lung, but examination revealed signs of a large right pleural effusion. Half a pint (284 ml.) of straw-coloured fluid was aspirated from the right thorax, though much more could have been removed. A chest *x*-ray film on March 23 showed clear lung fields and only a slight haziness in the right cardiophrenic angle.

Several therapeutic agents were administered: chloramphenicol, 500 mg. six-hourly, from March 4 to 22; penicillin, 300,000 units four-hourly, from March 8 to 13; and "sulphatriad," 1 g. four-hourly, from March 12 to 17. These drugs had no effect on the temperature, which swung between 100 and 102° F. (37.8 and 38.9° C.) and had no apparent effect on the migratory arthritis or mental upset, although these symptoms had improved somewhat by March 19. On March 22 sodium salicylate, 120 gr. (8 g.) daily, was started, and other medication discontinued. The temperature fell to normal on the 23rd and remained normal except for rises to 99° F. (37.2° C.) on March 31 and April 8, and the arthritis at once improved and soon cleared up. The mental upset speedily disappeared. The E.S.R., which was 90 mm. in the first hour and 114 mm. in the second hour on March 23, slowly fell. It was 75 and

98 mm. on March 30, 56 and 88 mm. on April 6, 60 and 80 mm. on April 13, and 15 and 45 mm. on April 27.

On April 6 a soft systolic murmur, best heard at the mitral area and at the lower left border of the sternum, was heard for the first time, and this murmur was still present on May 1. At the latter date the general condition of the patient was excellent. There was no evidence of cardiac insufficiency at any time.

The following investigations were negative: examination of the urine for blood, albumin, sugar, bile, cells, casts, and culture for organisms; blood culture on March 7, 8, and 16; W.R. and Kahn tests on March 2 and 14; culture of faeces for dysentery and typhoid groups on March 6; serological examination for typhoid, paratyphoid, and abortus on March 6 and 20; Schuffner test for *L. icterohaemorrhagiae* and *L. canicola* on March 8; sputum for tubercle bacilli on several occasions; direct examination and culture of pleural fluid for pyogenic organisms; direct examination, culture, and guinea-pig inoculation of pleural fluid for tubercle bacilli. The blood urea was within normal limits during the course of the illness. An electrocardiogram on April 27 showed no abnormality.

Comment.—As the patient had haematemesis from a duodenal ulcer in 1939 and again in 1948, and the chest *x*-ray film on March 8 showed a rather high left diaphragm, the underlying condition was thought to be either a left subphrenic abscess or a bronchial carcinoma with secondaries in the brain. The first diagnosis had to be abandoned when screening on March 14 showed that the diaphragmatic elevation was due merely to gas in the stomach and intestine, and the second diagnosis was disproved by the course of the illness.

Discussion

Broadly speaking, the cases of rheumatic "pneumonia" reported fall into two main clinical groups, though many cases show features of both, and the pathology appears to be the same. In the first group the lower lobes, oftener the left, are affected, the consolidation is usually extensive, and its duration, though sometimes only a week or two, may be a matter of months. In the second group the consolidation tends to be focal, multilobular, evanescent, and migratory, though if the infection is severe the lungs may become so widely involved that death results.

Cheadle (1888), Naish (1928), Muirhead and Haley (1947), and Van Wijk (1948) have described cases which belong to the first group, and most of Rabinowitz's (1926) cases seem to come into this category. Examples of the second group of cases in which the consolidation tends to be focal and multilobular have been described (Coburn, 1933; Neubuerger *et al.*, 1944; Griffith *et al.*, 1946; Jensen, 1946; Mossberger, 1947; Seldin *et al.*, 1947; Levy *et al.*, 1948; Gonzalez, 1949). In severe cases death ensued with widespread pulmonary involvement, but in milder cases the lesions tended to be migratory and ephemeral. Cough with a tenacious blood-stained sputum has been noted by several authors, including Paul (1928), Muirhead and Haley (1947), and Seldin *et al.* (1947), and the latter observers found the sputum on occasion contained frank blood. Griffith *et al.* (1946) found a blood-stained sputum in the severer cases. *X*-ray films showed cloudy opacities which tended to disappear and reappear in the same or other situations. Similar migratory opacities have been noted in asthma (Harkavy, 1941), angioneurotic oedema (Vaughan and Hawke, 1931; Cole and Korns, 1933), periarteritis nodosa (Weir, 1939; Elkeles, 1944), and in Löffler's syndrome (Löffler, 1932). Arthritis and pulmonary manifestations without evidence of carditis have been reported by Jensen (1946) and Van Wijk (1948).

Salicylate therapy appears to have little effect on the course of rheumatic "pneumonia." Cheadle (1888) and Seldin *et al.* (1947) stated that pyrexia was unaffected by salicylates, though Naish (1928) mentioned that in cases receiving salicylates there was little rise in temperature. Levy *et al.* (1948) found that neither salicylates nor penicillin had any effect. Some observers have considered that the pathological changes may be due to congestion as a result of heart failure, but Epstein and Greenspan (1941) did not find the characteristic, if non-specific, pathological picture in the lungs of patients dying with pulmonary congestion as a result of hypertension, coronary thrombosis, or mitral stenosis without active rheumatic infection. Gregory and Rich (1946), by injecting rabbits with foreign protein, were able to produce changes in the lung similar to those seen in "rheumatic pneumonia." They considered that an anaphylactic angiitis affecting mainly the capillaries is the essential lesion in the rheumatic lung, and that all the other findings can be explained on this basis.

In interpreting the pathological changes found in the lungs in acute rheumatism observers have differed in their estimation of the part played by cardiac insufficiency, many believing that this is the principal factor. Cases of rheumatic fever showing arthritis and pulmonary manifestations without carditis are therefore of interest, though in the absence of a specific test it is then difficult to be certain of the diagnosis of rheumatic fever. The first case described here falls into this category, and, although cardiac involvement was eventually detected in the second, there was never evidence of failure. Pulmonary manifestations in rheumatic fever may be very misleading; Griffith *et al.* (1946) state that some of their cases were diagnosed as "atypical pneumonia" until cardiac involvement became apparent.

My thanks are due to Dr. James McIntosh, consultant physician, Western District Hospital, Glasgow, for permission to publish these cases, and to the resident medical officers who assisted with investigations.

REFERENCES

Boisvert, P. L. (1940). *J. clin. Invest.*, **19**, 65.
Bunim, J. J., and McEwen, C. (1940). Ibid., **19**, 75.
Cheadle, W. B. (1888). *Lancet*, **1**, 861.
Coburn, A. F. (1933). *Amer. J. Dis. Child.*, **45**, 933.
Cole, J., and Korns, H. M. (1933). *J. Allergy*, **5**, 347.
Elkeles, A. (1944). *Brit. J. Radiol.*, **17**, 368.
Epstein, E. Z., and Greenspan, E. B. (1941). *Arch. intern. Med.*, **68**, 1074.
Gonzalez, R. E. (1949). *Arch. Hosp. univ., Habana*, **1**, 75.
Gregory, J. E., and Rich, A. R. (1946). *Bull. Johns Hopk. Hosp.*, **78**, 1.
Griffith, G. C., Phillips, A. W., and Asher, C. (1946). *Amer. J. med. Sci.*, **212**, 22.
Harkavy, J. (1941). *Arch. Intern. Med.*, **67**, 709.
Jensen, C. R. (1946). Ibid., **77**, 237.
Levy, H. B., Coffey, J. D., and Anderson, C. E. (1948). *Pediatrics*, **2**, 688.
Löffler, W. (1932). *Beitr. Klin. Tuberk.*, **79**, 368.
Mossberger, J. I. (1947). *J. Pediat.*, **30**, 113.
Muirhead, E. E., and Haley, A. E. (1947). *Arch. intern. Med.*, **80**, 328.
Naish, A. E. (1928). *Lancet*, **2**, 10.
Neubuerger, K. T., Geever, E. F., and Rutledge, E. K. (1944). *Arch. Path.*, **37**, 1.
Paul, J. R. (1928). *Medicine*, **7**, 383.
Rabinowitz, M. A. (1926). *J. Amer. med. Ass.*, **87**, 142.
Seldin, D. W., Kaplan, H. S., and Bunting, H. (1947). *Ann. intern. Med.*, **26**, 496.
Van Wijk, E. (1948). *Acta paediat.*, **35**, 108.
Vaughan, W. T., and Hawke, E. K. (1931). *J. Allergy*, **2**, 125.
Weir, D. R. (1939). *Amer. J. Path.*, **15**, 79.
Woodland, R. J. T. (1947). *Lancet*, **2**, 540.

K. Hellmann, of the M.R.C. Climatic and Working Efficiency Unit, raises an interesting physiological point in a recent issue of *Nature* (January 19, p. 113). As is well known, the sweat glands of the skin receive an innervation from the sympathetic nervous system, but, unlike other organs under sympathetic control, are not brought into action also by adrenaline but only by pilocarpine and acetylcholine; and they are inhibited by atropine. Hellmann has been studying the cholinesterase of the sweat glands in the pad of the cat's foot by a series of histochemical tests which enable him to display the distribution of enzyme activity throughout a tissue section, and to define the enzyme's specificity of action. He finds that the enzyme is present in the terminal nerve fibres, and disappears when these degenerate, and also that its specificity differs from that of the true cholinesterases hitherto found in nerve fibres, which specialize in the hydrolysis of acetylcholine. This leads him to suggest that the sympathetic cholinergic transmitter may not be acetylcholine after all, but some allied substance.

THE DURATION OF THE ACTION OF DIFFERENT INSULINS

BY

F. GERRITZEN, M.D.

(From the Department of Endocrinology and Diseases of Metabolism, Medical Service, University Hospital, Leyden, Holland)

This investigation was undertaken to compare the different insulins under the same experimental conditions, and to ascertain the duration and, if necessary, the character of the action of new insulins brought on the market. The textbooks on insulin do not supply any data on the duration of action (Grevenstuk and Laqueur, 1925; Hill and Howitt, 1936; Geiling *et al.*, 1937; Jensen, 1938; Joslin, 1946).

Experimental Method

The experimental conditions are of great importance. In the first place, it would seem desirable to investigate the action of insulin in human beings, and so avoid the necessity of adapting the results obtained with test animals. Besides, the experimental conditions of this investigation would not be suitable for animals. It would, of course, have been advisable to use diabetic patients, but for various reasons this was not possible.

The subjects were young healthy student volunteers, whose blood sugar was investigated under standardized conditions, as follows. They were asked to lie down from 11 p.m. the night before—that is, seven hours previous to the experiment—and also during the experiment, in order to eliminate the influence of exercise on the blood sugar. From 6 a.m. onward on the day of the experiment they ate 50 g. of mashed potatoes (about 10 g. of carbohydrate) and drank 30 ml. of water every hour, until the experiment was finished —that is, until the average blood sugar had returned to its original level. Every hour the blood sugar was determined according to the Hagedorn-Jensen method. The values at 7 a.m. and 8 a.m. were used as a starting-point. At 8 a.m. 20 units of insulin was injected subcutaneously, a different brand of insulin being given to each group of test persons. One group which did not receive any insulin served as controls.

In all, 10 different insulins were tested. The accompanying Chart shows the number of persons in each group from whom the average was calculated. This method was chosen because it eliminates all other factors which might influence the blood-sugar level (Himsworth, 1934; Martin *et al.*, 1940). As fasting might decrease the blood sugar, food to a standardized amount was given each hour, to prevent the rise in blood-sugar level which would occur with a larger food intake and which might simulate the end of the action of the insulin. On this matter Peck (1942) states: "There have been only a few published reports of clinical investigations of protamine-zinc insulin which have taken advantage of the invaluable procedure of measuring the rate of insulin action against a known constant carbohydrate intake."

With the present method one finds a constant average blood-sugar level in healthy people, so that any decrease of this level may be attributed to the insulin. If diabetic patients are examined under these conditions a 24-hour rhythm is found in the blood sugar (Gerritzen, 1942). This makes it very difficult, if not impossible, to judge whether the decrease is in consequence of the 24-hour rhythm or whether it should be attributed to insulin. Besides, it is impossible to find enough diabetic subjects in whom to calculate the average blood-sugar level after the administration of insulin.

The hourly intake of 10 g. of carbohydrate diminishes the hypoglycaemia, and this would meet the objection that

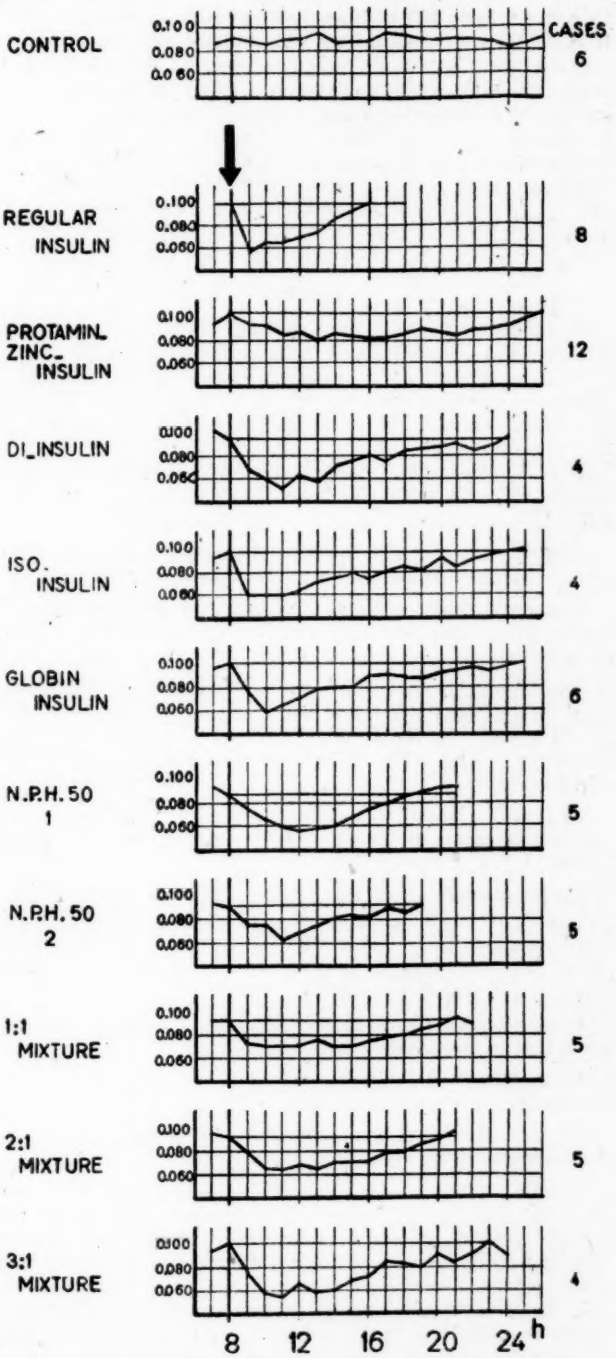


Chart showing duration of action of various insulins.

with a strong decrease of the blood sugar a regulating mechanism, with adrenaline as its principal component (Drury and Greeley, 1939), might become active and thus render evaluation of the action of insulin impossible. During my experiments only minor hypoglycaemic symptoms occurred, and, as expected, without any close relation to the level of the blood sugar.

In addition to the duration of action of equal doses (20 units) of various insulins, it was my intention to find out whether there were any differences in the character of their action (de Jongh, 1924). While assuming that the resorption of insulin in diabetic persons does not in any way differ from that in normal individuals, I think that the differences in action in the latter may also apply to diabetics. In other words, that the order of succession in the duration of the action, as demonstrated in this experiment with healthy

individuals, may also be supposed to exist in diabetic patients. It is obvious, of course, that the actual figures characterizing the duration of the action of insulin in this experiment need not apply to diabetics. However, if, under the conditions of this experiment, it is found that regular insulin is effective for eight hours, this result would agree fairly well with the data in the literature (Scott and Dotti, 1932; Lawrence, 1938; Martin *et al.*, 1940; Peck, 1942; Colwell, 1947), and one would not be far out in accepting the figures as applying to diabetics.

Results

In the control group no significant deviation was found between the average blood sugar values at different hours. There was a significant deviation between the blood-sugar values of the different test persons, calculated according to the F-test (Davies, 1949), the standard error of which was 6.9 units if the blood-sugar values are expressed in percentages to the third place of decimals. In the group receiving insulin there was no significant increase of this standard error in comparison with the control group.*

Control Group.—The average blood-sugar level does not show any oscillations, and may be considered constant.

Regular Insulin (Organon).—The blood sugar reaches its lowest point after one hour and returns to its starting point in eight hours.

Protamine-zinc Insulin (Organon).—Contrary to the many data in the literature, I find for P.Z.I. a duration of action of 18 hours. No evidence was found of a duration of 48 hours or longer. The lowest point is reached in five to eight hours.

Di-insulin (Novo).—Duration of action, 16 hours. The greatest decrease in blood sugar is during the first three hours.

Iso-insulin (Novo).—Duration of action 17 hours. Rapid decrease of sugar in the first hour. The steep decrease within the first hour leads to the assumption that this preparation contains regular insulin, but, according to Hallas Möller, this is not the case.

Globin Insulin (Burroughs Wellcome).—Action is identical with that of di-insulin.

(1) *N.P.H. 50 (Organon).*—Duration of action, 11 hours. Lowest point after four hours.

(2) *N.P.H. 50 (Lilly).*—Duration of action, 11 hours. Lowest point after three hours.

Insulin Mixtures (Organon).—The impression is gained that the duration of action of the mixture depends on the regular insulin content only so far as the decrease during the first three hours is greatest with the mixture containing most regular insulin—the 3:1 mixture—and that thereafter the blood sugar takes longer to come back to the starting-point than with the 2:1 and the 1:1 mixtures. This would explain the longer duration of the action with a higher regular insulin content.

I am indebted to Miss S. P. I. Hoogeveen for the accurate blood-sugar determinations, and to Mr. F. H. Stieltjes for the statistical calculations. I am grateful also to the 64 students who voluntarily served as test subjects. This experiment was made possible by a grant from Messrs. Burroughs Wellcome and Co.

*An analysis of variance is effected with the control group, globin insulin 1:1 mixture, 2:1 mixture, and 3:1 mixture according to Fisher (1937). The χ^2 test (Bartlett test 3), applied to all error variances, showed that the inclusion of the 1:1 mixture in the calculations led to very uncertain results; otherwise this experiment had a very low error variance. The χ^2 test was employed to find whether there was an individual variance of reaction to insulin, as this would only result in an increase of the error variance. There remains, therefore, a reasonable chance that there are no individual differences of reaction to insulin. This implies that there is a reasonable possibility that, by increasing the number of test persons, more definite results might be obtained.

REFERENCES

Aitken, R. S. (1938). *Lancet*, **1**, 669.
Colwell, A. R. (1947). *Med. clin. N. Amer.*, **31**, 327.
Davies, O. L. (1949). *Statistical Methods in Research and Production*, pp. 60, 113.
Drury, D. R., and Greeley, P. O. (1939). *Amer. J. Physiol.*, **127**, 581.
Fisher, A. R. (1937). *Design of Experiments*, p. 57. Edinburgh.
Geiling, E. M. K., Jensen, H., and Farrar, G. E., jun. (1937). In *Handbuch der experimentellen Pharmakologie*, by A. Heffter *et al.*, **5**, 197. Berlin.
Gerritzen, F. (1942). *Acta med. scand.*, **111**, 212.
Grevenstuk, A., and Laqueur, E. (1925). *Ergebn. Physiol.*, **23**, II Abt., p. 1.
Hill, D. W., and Howitt, F. O. (1936). *Insulin*. London.
Himsworth, H. P. (1934). *J. Physiol.*, **81**, 29.
Jensen, H. F. (1938). *Insulin, its Chemistry and Physiology*. London.
de Jongh, S. E. (1924). *Biochem. J.*, **18**, 833.
Joslin, E. P. (1946). *Treatment of Diabetes Mellitus*, 8th ed., p. 363. Philadelphia.
Lawrence, R. D. (1938). *Lancet*, **1**, 669.
Martin, H., Drury, D. R., and Strouse, S. (1940). *Arch. intern. Med.*, **66**, 78.
Peck, F. B. (1942). *Proc. Amer. Diabetes Ass.*, **2**, 67.
Scott, E. L., and Dotti, L. B. (1932). *Arch. intern. Med.*, **50**, 511.

BIBLIOGRAPHY

The following bibliography is, of course, not complete, but will serve readers who wish to obtain information on the action of the different insulins

Protamine-zinc Insulin

Aitken, R. S. (1938). *Proc. roy. Soc. Med.*, **31**, 1217.
Himsworth, H. P. (1937). *British Medical Journal*, **1**, 541.
Kerr, R. B., and Best, C. H. (1937). *Amer. J. med. Sci.*, **194**, 149.
Lawrence, R. D. (1938). *Proc. roy. Soc. Med.*, **31**, 1217.
—— (1939). *British Medical Journal*, **1**, 1077.
—— and Archer, N. (1937). Ibid., **1**, 487.
MacBryde, C. M., and Roberts, H. K. (1943). *J. Amer. med. Ass.*, **122**, 1225.
Martin, H. E., and Greeley, P. O. (1942). *Amer. J. med. Sci.*, **203**, 402.
Masenthal, H. O. (1944). *J. Amer. med. Ass.*, **125**, 483.
Wilder, R. M., and Wilbur, D. L. (1937). *Arch. intern. med.*, **59**, 329.

Iso-insulin and Di-insulin

Boulin, R., Uhry, P., and Nepveux, F. (1947). *Bull. Soc. méd. Hôp. Paris*, **63**, 41.
Brull, L., Drury, A., Lambrechts, A., Lefebvre, L., Piersotte, J., and Toussaint, C. (1947). *Rev. méd. Liège*, **2**, 631.
Gerritzen, F. (1948). *Ned. Tijdschr. Geneesk.*, **92**, 471.
Hallas-Möller, K. (1945). *Chemical and Biological Insulin Studies*.
—— and Hey, A. (1944). *Ugeskr. Laeg.*, **106**, 565.
Hey, A. (1945). Ibid., **107**, 901.
Kestermann, E., and Thöne, H. (1949). *Med. Klinik.*, **44**, 934.
M'Lady, P. (1948). *Klin. Med., Wien*, **3**, 207.
Slessor, A. (1947). *Lancet*, **1**, 820.

Globin Insulin

Andrews, G. B., and Groat, W. A. (1940). *N.Y. St. J. Med.*, **40**, 913.
Bailey, C. C., and Marble, A. (1942). *J. Amer. med. Ass.*, **118**, 683.
Bauman, L. (1939). *Amer. J. med. Sci.*, **198**, 475.
—— (1939). *Proc. Soc. exp. Biol., N.Y.*, **40**, 170.
—— (1940). *Amer. J. med. Sci.*, **200**, 299.
Duncan, G. G., and Barnes, C. E. (1941). *Amer. J. med. Sci.*, **202**, 553.
Gabriele, A. J., and Marble, A. (1949). *Amer. J. digest. Dis.*, **16**, 197.
Jackson, R. L., and McIntosh, C. B. (1945). *Amer. J. Dis. Child.*, **70**, 307.
Lawrence, R. D. (1943). *British Medical Journal*, **2**, 103.
Marks, H. E. (1940). *Med. Clin. N. Amer.*, **24**, 649.
Martin, H. E., Simonsen, D. G., and Homann, N. H. (1944). *Amer. J. med. Sci.*, **208**, 321.
Mosenthal, H. O. (1944). *J. Amer. med. Ass.*, **125**, 483.
Peck, F. B. (1947). *Med. Clin. N. Amer.*, **31**, 343.
Rabinowitch, I. M., Fowler, A. F., Bensley, E. H., Gordon, A. L., and Mountford, M. (1947). *Canad. med. Ass. J.*, **56**, 595.
Reiner, L., Searle, D., and Lang, E. H. (1939). *Proc. Soc. exp. Biol., N.Y.*, **40**, 171.
Roberts, J. T., and Yater, W. M. (1947). *Ann. intern. Med.*, **26**, 41.
Trasoff, A., Borden, Ch., and Mintz, S. S. (1945). *Amer. J. digest. Dis.*, **12**, 313.
Wauchope, G. M. (1948). *British Medical Journal*, **2**, 191.

N.P.H. 50

Gabriele, A. J., and Marble, A. (1949). *Amer. J. digest. Dis.*, **16**, 197.
Kirkpatrick, N. R. (1949). *Proc. Mayo Clin.*, **24**, 365.
White, P. (1949). *J. Amer. med. Ass.*, **141**, 312.

Insulin Mixtures

Colwell, A. R. (1947). *Diabetes Mellitus in Medical Practice*. Chicago.
—— and Izzo, J. L. (1943). *J. Amer. med. Ass.*, **122**, 1231.
—— —— and Stryker, W. A. (1942). *Arch. intern. Med.*, **69**, 931.
Graham, G. (1938). *Lancet*, **1**, 669.
Hildebrand, A. G., and Rynearson, E. H. (1943). *Arch. intern. Med.*, **72**, 37.
Lawrence, R. D. (1938). *Acta med. scand.*, Suppl. 90, 32.
Peck, F. B. (1943). *Ann. intern. Med.*, **18**, 177.
—— (1947). *Med. Clin. N. Amer.*, **31**, 343.
Sparks, M. I., and John, H. J. (1943). *Ohio St. med. J.*, **39**, 226.
Sprague, R. G. (1949). *Ann. intern. Med.*, **31**, 628.
Wauchope, G. M. (1940). *Lancet*, **1**, 962.

The Ministry of Health has reminded local authorities (circular 5/52 of January 21) that they have powers to find and pay for temporary homes for mental defectives when these patients cannot be looked after by their families—for example, during illness in the house, or in holiday periods.

TREATMENT OF HYPERTENSION BY ORAL METHONIUM COMPOUNDS

BY

A. J. M. CAMPBELL, M.B., F.R.F.P.S.
Medical Registrar, Royal Alexandra Infirmary, Paisley

J. GIBSON GRAHAM, M.D., F.R.F.P.S.
Senior Physician, Royal Alexandra Infirmary, Paisley; Associate Physician, Western Infirmary, Glasgow

AND

R. D. H. MAXWELL, M.B., Ch.B., B.Sc.
May and Baker, Ltd.

For almost two years we have used methonium compounds in the treatment of hypertension, and during this time have examined their action upon nearly 100 patients, of whom a fair cross-section have been followed up and observed in detail.

Hexamethonium, pentamethonium, and hexamethylene *bis*-dimethylethyl ammonium ("M. & B. 1863") in bromide, chloride, iodide, and tartrate salts have been used. Our chief aim has been to establish, where possible, control of the hypertension and relief of symptoms mainly by the oral dosage of one of these compounds.

Since the original clinical investigations of the effect of pentamethonium and hexamethonium upon the cardiovascular system (Arnold and Rosenheim, 1949; Arnold, Goetz, and Rosenheim, 1949), a series of reports have appeared upon their therapeutic application. Smirk and Alstad (1951), giving these drugs chiefly parenterally, have described the precise control of pressure which is obtainable. Saville (1950), Turner (1950), and Mackey and Shaw (1951b), together with Campbell and Robertson (1950), have, with oral administration, obtained a reasonable depression of the blood pressure of many of their cases, accompanied by a clinical improvement comparable at times to that seen when the drug is given parenterally. The action is much less constant and less apparent when assessed by the effect upon the pressure, and Locket, Swann, and Grieve (1951) have recorded that in their series there was little effect upon the pressure of out-patients.

We have treated hypertensive patients with methonium compounds when their response to dietary limitation and sedation was unsatisfactory, and by careful examination have excluded patients with hypertension of remedial origin. Renal disease was not regarded as a contraindication, and several cases of chronic nephritis with hypertension and severe symptoms were treated.

It is known that most patients with hypertension may be maintained symptom-free by severe dietary restriction and sedation in hospital, but it is equally recognized that often when these patients return home or to work there follows a reversal of improvement both in symptoms and in blood pressure. In the absence of any treatment of the underlying cause of the hypertension there is every indication for an out-patient therapeutic measure which would enable these patients to be maintained in reasonably good health, with an arrest of progress of their symptoms and signs.

We gave methonium compounds intravenously, intramuscularly, subcutaneously, and orally, and tended to use parenteral routes for investigation and the oral route for treatment. Latterly we employed combined oral and subcutaneous administration when the pressure response to oral administration was unsatisfactory. Parenteral dosage consisted in the cautious administration of 10–15 mg. of hexamethonium bromide initially, with increase in quantity and frequency until up to 300 mg. in divided doses was given daily. Oral dosage begins with a single tablet, followed by a progressive increase in frequency and quantity to a maximum of 12–16 tablets a day. Tablets of comparable methonium content were used—that is, a 250-mg. tablet of hexamethonium bromide, which is equivalent to a 350-mg. tablet of the bitartrate and to 125 mg. of M. & B. 1863 bromide.

At no time was more than 4 g. of hexamethonium bromide given daily, as activity is not proportional to dosage beyond this level, other than a possible local effect upon the bowel. Clinical results are tabulated in three groups.

1. Essential Hypertension

This group comprised most of our cases, their ages ranging from 29 to 67 years. All had a diastolic pressure above 115 mm. Hg. Of these patients 35 who could conveniently attend for regular examination were observed at short intervals for a period of 4–18 months, the average duration of treatment being 12 months. Hexamethonium was used in 25 and M. & B. 1863 in 10, in both bromide and bitartrate salts.

In every case methonium treatment was preceded by at least 14 days' rest in bed, with sedation and dietary limitation. Cases were selected for treatment only when the response was either disappointing or absent.

Effect upon Signs and Symptoms

The incidence of the signs and symptoms of 16 male and 19 female patients with essential hypertension are reproduced in Table I.

Results are expressed by the classification of Wagener and Keith (1939), which is a clinical assessment and is also of some prognostic value.

TABLE I

Symptoms	Incidence	Signs	Incidence
Headache	29	Cardiac enlargement	10
Lassitude	24	Left ventricular preponderance	16
Vertigo	13	Orthopnoea	8
Dyspnoea	26	Cardiac asthma	1
Palpitation	10	Congestive cardiac failure	3
Precordial discomfort	9	Albuminuria	2
Angina pectoris	3	Previous cerebral vascular disorders	6
Encephalopathy	6	Fundal changes:	
Mental deterioration	8	Grade I	8
		Grade II	20
		Grade III	3
		Grade IV	4

TABLE II.—*Number in Each Group by the Classification of Wagener and Keith Before and After Treatment*

Group	Before Treatment	After Treatment
I	—	1
II	2	23
III	29	10
IV	4	1

Table II shows the change in grading after treatment—that is, a marked reduction in symptoms and signs. Clinical improvement was obtained in 23 out of 35 cases, with results

similar to those recorded by Smirk and Alstad (1951). Most striking was the relief of headache, and this could be obtained in some patients with a dosage too low to influence systemic blood pressure. Regression of papilloedema, when present, and organization of exudates and haemorrhages were noted. Dyspnoea was markedly reduced, and over a period of months reduction in size of the heart was seen when enlargement was present before treatment. The most remarkable effect was the return of most of these patients to a state of normal activity, either to work or to domestic duties. There were a number of failures. Two young adults with a symptomless hypertension were treated prophylactically without producing a fall in pressure. One patient developed a hypertensive encephalopathy during treatment, and in another two cases there was a possible extension of a recent cerebral thrombosis. One patient with severe headaches and a previous cerebral thrombosis had no relief of headache despite a satisfactory fall in pressure.

Effect upon the Blood Pressure

The assessment of the long-term effect of hexamethonium on the blood pressure is difficult. We found that in many cases it is possible to produce by oral and by parenteral administration of the methonium compounds a fall much greater than is seen during rest in bed alone, and this fall bears no relation to that obtainable during profound sedation such as the sodium amytal test. When these drugs were used parenterally it was possible to obtain low levels of pressure, as Smirk and Alstad (1951) have described. Treatment was mainly by the oral route, which differs from parenteral administration in that the response is much slower, single doses producing a much less definite effect. It is generally necessary to administer the drugs for several days, during which time a fall in the pressure is observed in favourable cases, either beginning immediately or after several days, suggesting a cumulative effect. During this initial period of treatment one-third of the patients had diastolic pressures of under 100 mm. In a further one-third the effect upon the pressure, while considerable, was not so pronounced, and in the remaining one-third the systolic and diastolic pressures fell less than 20 mm. The fall was generally greater in the systolic than in the diastolic pressure. An increase of dosage does not produce any greater response, but the addition of parenteral administration was usually effective in producing lower pressure levels.

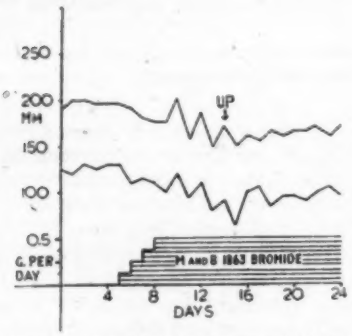


FIG. 1.—Typical response of blood pressure to M. & B. 1863.

The maximum effect is found about the seventh to fourteenth day of treatment. A typical response is recorded in Fig. 1.

The blood pressures of out-patients show an initial progressive rise, and the drug loses some of the original effectiveness during the first weeks of treatment. Subsequently tolerance does not appear to increase for a period of one to two months, and this not in all patients. Tolerance developed more rapidly to M. & B. 1863 than to the other compounds. Withdrawal of treatment for a period of a few weeks or less is usually followed by some loss of this tolerance, and resumption must be cautious. While tolerance to pentamethonium and hexamethonium was interchangeable, this did not always apply to tolerance developed to M. & B. 1863 and hexamethonium. Locket, Swann, and Grieve (1951) have attributed much of the effect upon pressure to the high concomitant dosage of bromide. In six cases we substituted for hexamethonium bromide similar tablets of potassium bromide with the same bromide ion content, and found a steady rise in pressure and recurrence of symptoms identical with results obtained by drug withdrawal. Further, hexamethonium bitartrate was found to be as effective therapeutically as hexamethonium bromide.

Fig. 2 shows the effect of hexamethonium bromide and bitartrate upon the blood pressure.

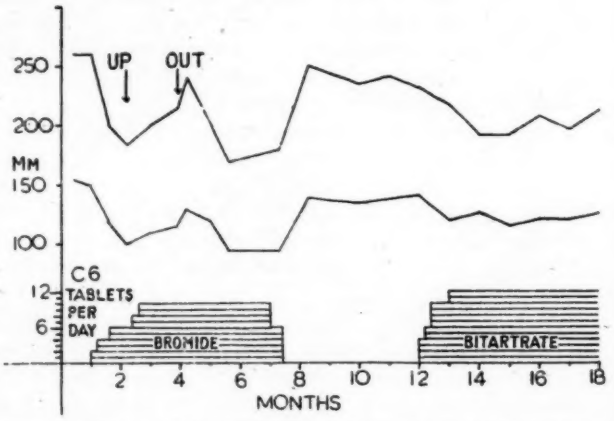


FIG. 2.—Effect of hexamethonium bromide and bitartrate on blood pressure.

2. Chronic Nephritis

Table III records the effect of hexamethonium bromide upon five patients with chronic nephritis with marked hypertension, impairment of renal function, and fundal changes. In each case some reduction of pressure has been possible, with good alleviation of symptoms and signs. Poor renal function in these cases was not a contraindication to treatment. Renal pathology, however, was unaltered, and two of these patients died during treatment—one from cardiac failure and the other from uraemia.

3. Malignant Hypertension

Two young patients with progressive hypertension and grave signs and symptoms were treated, their initial progress having been recorded previously by Campbell and Robertson (1950).

Case 1.—A married woman aged 22 was found in the third month of her pregnancy to have marked hypertension, which was unaltered when pregnancy was terminated at the

TABLE III

Age and Sex	Before Treatment			Treatment with Hexamethonium							
				Renal Function							
	Initial B.P.	Symptoms	Signs	Alb. (Esbach)	Volhard–Fishberg max.		Blood Urea mg./100 ml.	Average B.P.	Dosage g./day	Symptoms	Signs
					Conc.	Dil.					
41 F. ..	275/150	Severe	Severe	2	1018	1012	65	200/125	3·5	Minimal	Moderate
39 M. ..	220/140	,,	,,	Tr.	1015	1002	35	205/120	3	,,	,,
22 F. ..	225/165	Minimal	Minimal	1	1010	1002	30	210/135	2	Absent	Minimal
46 M. ..	260/180	Severe	Moderate	1	1010	1010	30	250/150	3	Moderate	Moderate
15 F. ..	230/130	,,	Severe	2	1010	1010	130	180/110	2·5	,,	,,

fifth month owing to a steady rise in pressure, with dimness of vision and increasing headaches. During the subsequent three months in hospital her condition deteriorated, with increasing blood pressure and the appearance of albuminuria, and the prognosis seemed to be very poor. Hexamethonium bromide in an average daily dosage of 2 g. was administered for six weeks, producing a fall in pressure from 220/135 to 140/90, with disappearance of headaches, visual improvement to normal, and regression of fundal changes from grade IV to grade II. During the past year she has been keeping house and leading a full life with no treatment whatsoever. However, during this period her albuminuria has tended to increase and her blood pressure rose steadily, reaching 180/105, so we decided to make a further attempt to modify her blood pressure. Marked sensitivity to hexamethonium was found, and, because of hypertensive vertigo, continuous administration does not appear at present to be advisable. It seems likely that the course of the disease has been modified, and that she has been given a useful extension of life.

Case 2.—This patient was a man aged 30, whose early treatment has previously been described. Subsequent progress was less favourable in that there was no arrest of his progressive renal lesion, but his general condition before death, which occurred eight months after the beginning of treatment, was good enough to permit of his discharge and even return to employment. Death was occasioned by uraemia, and the post-mortem findings were those of malignant hypertension.

Side-effects and Toxicity

The unselective action of the methonium compounds in producing a generalized interruption of the autonomic nervous system entails effects other than upon the blood pressure. Reference to this in the production of constipation and paralytic ileus has been made in the literature, particularly by Campbell and Robertson (1950), Bourne and Hosford (1951), and Mackey and Shaw (1951a), and transient effects upon accommodation and salivation have been described. The side-effects of M. & B. 1863 have not been significantly different in any respect.

No abnormal sensitivity to the initial dosage of methonium compounds orally was encountered, but early in our work two sudden circulatory collapses followed 100 mg. of hexamethonium bromide parenterally as a first dose.

During the earlier part of this investigation two patients developed bromide rashes and one-third of those treated had bromide retention accompanied by drowsiness, fatigue, depression, and muscular weakness. Substitution of the bitartrate of chloride salts resulted in the disappearance of these symptoms with no diminution of therapeutic response, as already recorded by Campbell and Robertson (1951).

Overdosage of one of the methonium compounds produced a circulatory collapse.

A woman aged 59 had a blood pressure of 210/170 when first seen, and this pressure fell to 220/120 after four weeks in bed. She had severe symptoms of hypertension, and treatment with hexamethonium bromide in amounts up to 2 g. a day produced a fall in her pressure to 115/95. She was sent home to attend as an out-patient, and during the next two months the average levels of pressure were 160/100. She was readmitted comatose with a pressure of 55/30, probably due to a gross self-administered overdosage. The response to continuous adrenaline infusion was transient and death ensued in a few hours.

Discussion

Our experience of the clinical application of the methonium compounds in hypertension accords with the early observations reported from this unit (Campbell and Robertson, 1950) and with the observations of Turner (1950), Saville (1950), and Mackey and Shaw (1951b). It has been possible to alleviate or to remove symptoms and to effect a disappearance or marked regression of physical signs, resulting in reasonable health, compatible in most cases with the patient's return to useful activity and employment. No limitation has been imposed by age or severity of illness.

We are particularly interested to note that our clinical results were very similar to those obtained by Smirk and Alstad (1951), who used a more elaborate method of parenteral administration to obtain continuously lower levels of pressure than we sought. In fact, in our series we found that reduction of pressure to even 140/90 was not always well tolerated by patients who had a long history of hypertension. They complained of listlessness and fatigue.

Previous observations have been in general agreement in regard to the clinical improvements obtainable by oral dosage, but Locket, Swann, and Grieve (1951) have not reproduced the effects upon the blood pressure described. We have observed that, during treatment, blood pressures are very labile in many patients—downwards in response to erect posture and upwards in response to emotion and anxiety. Paton (1951) has noted the difference between the effect of methonium compounds and sympathectomy, the former blocking both the sympathetic and the parasympathetic components of the autonomic nervous system, so that there is a paralysis of the compensating mechanisms which normally maintain the constancy of the blood pressure; and procedures and drugs affecting the blood pressure will produce an exaggerated response. We have found it necessary to allocate a definite weekly time of attendance at the wards, where pressures are taken regularly by the hospital staff, who are known to the patients, in circumstances providing a reasonable period of observation. Failure to observe these precautions may have led to the disappointing results obtained by some workers, in direct contrast to the pressure records made during the careful and prolonged investigation by Mackey and Shaw (1951b).

Smirk and Alstad (1951) have declared that the optimum therapy in hypertension is the establishment of low levels of pressure; and Platt and Stanbury (1950), in the assessment of sympathectomy, have used as their criterion a fall of 20 mm. in the basal diastolic pressure. We have attempted rather to obtain a moderate but definite reduction over a long period in the blood pressure of these patients compared with their pressure when first seen. White, Dimond, and Williams (1950) have surveyed the morbidity and mortality over a three-year period among 100 patients with hypertension, half of whom had been subjected to sympathectomy. They found a much higher morbidity in the control series, and at the end of three years 16% of the sympathectomized patients were dead, as compared with 58% of the controls. They point out that this is more impressive evidence of the beneficial effect of this therapeutic measure in certain cases than is the usual method of studying the effect on blood pressure alone in cases in which important complications do not exist.

Ellis (1942) has emphasized that hypertension in itself does not constitute in general a serious limitation to life expectation, but, once signs and symptoms develop, a threshold has presumably been exceeded and the prognosis is altered.

From experience with hexamethonium administered orally it seems possible that a rather lower average of pressure, with relief of symptoms and some regression of signs, may enable a proportion of hypertensive patients to return to this asymptomatic category with its more favourable prognosis. Keith, Wagener, and Barker (1938) have examined the life expectation of patients with hypertension grouped in the categories we have used, and find that 30% of group I, 42% of group II, 78% of group III, and 98% of group IV do not survive four years. Most of our patients have fallen within group III, and in up to two years of continuous observations there have been no deaths other than the one occasioned by overdosage.

Summary

Methonium compounds have been in use for up to two years, and the treatment of an unselected group of

35 patients with hypertension and severe symptoms and signs is described. These compounds were used orally with variable results upon the blood pressure, but in 23 of the 35 patients there was a good symptomatic improvement with regression of the signs.

Hexamethonium also produced a symptomatic improvement in five patients with severe chronic nephritis and two with malignant hypertension.

We are grateful to Dr. E. Robertson for his work during the early part of this trial and to other members of the hospital staff for their assistance. Mr. E. J. Baines, of the New Products Division of May & Baker Ltd., kindly made available the supplies of the compounds used.

REFERENCES

Arnold, P., Goetz, R. H., and Rosenheim, M. L. (1949). *Lancet*, **2**, 408.
—— and Rosenheim, M. L. (1949). Ibid., **2**, 321.
Bourne, G., and Hosford, J. (1951). Ibid., **1**, 527.
Campbell, A., and Robertson, E. (1950). *British Medical Journal*, **2**, 804.
—— —— (1951). *Lancet*, **1**, 797.
Ellis, A. (1942). Ibid., **1**, 1.
Keith, N. M., Wagener, H. P., and Barker, N. W. (1938). *Trans. Ass. Amer. Phys.*, **53**, 81.
Locket, S., Swann, P. G., and Grieve, W. S. M. (1951). *British Medical Journal*, **1**, 778.
Mackey, W. A., and Shaw, G. B. (1951a). Ibid., **1**, 1205.
—— —— (1951b). Ibid., **2** 259.
Paton, W. D. M. (1951). Ibid., **1**, 773.
Platt, R., and Stanbury, S. W. (1950). *Lancet*, **1**, 651.
Saville, S. (1950) Ibid., **2**, 358.
Smirk, F. H., and Alstad, K. S. (1951). *British Medical Journal*, **1**, 1217.
Turner, R. (1950). *Lancet*, **2**, 353.
Wagener, H. P., and Keith, N. M. (1939). *Medicine*, **18**, 317.
White, P. D., Dimond, E. G., and Williams, A. (1950). *J. Amer. med. Ass.*, **143**, 1311.

M. & B. 1863, A HOMOLOGUE OF HEXAMETHONIUM, IN TREATMENT OF HYPERTENSION

BY

S. LOCKET, M.B., B.S., M.R.C.P.
Physician-in-Charge, Medical Unit

P. G. SWANN, M.D., M.R.C.P.
Senior Registrar, Medical Unit

W. S. M. GRIEVE, M.Sc., Ph.D., F.R.I.C.
Biochemist

AND

H. P. PLAYER, M.R.C.S., L.R.C.P., D.R.C.O.G.
Late Registrar, Obstetric Unit
Oldchurch Hospital, Romford, Essex

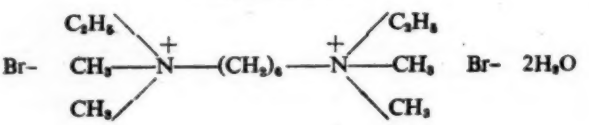
Following work by Paton and Zaimis (1949), Organe, Paton, and Zaimis (1949), and Arnold and Rosenheim (1949), pentamethonium and hexamethonium compounds have been used for the investigation and treatment of hypertension and peptic ulceration (Kay and Smith, 1950, 1951). It has been the experience of some (Freeman, 1950; Locket, Swann, and Grieve, 1951; Banton, 1951) that the oral administration of these in hypertension may fail to produce and maintain a lower blood pressure. Smirk (1950, 1951) and Frankel (1951) have suggested that, therapeutically, hexamethonium bromide should be given subcutaneously, much as insulin is given, the patient being instructed to inject an appropriate dose once or twice daily, or even more frequently.

Bromidism (Rosenheim, 1951; Holt and Litchfield, 1951; Locket *et al.*, 1951; Campbell and Robertson, 1951; Sommerville and Allan, 1951), cerebral thrombosis (Locket *et al.*, 1951; C. F. J. Cropper, 1951, personal communication), coronary thrombosis and death (Hirson and Kelsall, 1951; Locket *et al.*, 1951) have been recorded with these drugs, and in our opinion injection by the patient himself in doses adequate to produce any fall in blood pressure can be an extremely dangerous procedure.

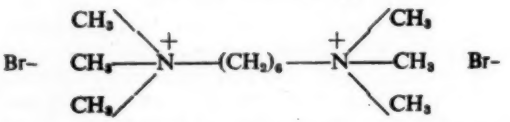
In a previous paper (Locket *et al.*, 1951) we expressed the view that much of the subjective improvement recorded in these patients was due to sedation, reassurance and its consequent relief of anxiety, and possibly other measures instituted, such as a salt-free diet. We did not feel, in view of the natural history of essential hypertension, that any of the symptomatic improvement could reasonably be attributed to the oral administration of the methonium compounds when used by us. Ayman (1930) pointed out that all methods of treatment of hypertension have in common the "enthusiastic treatment of a worried patient," and to this he attributed most of their success.

Through the good offices of Dr. R. Forgan, Messrs. May and Baker Ltd. have kindly provided us with a supply of hexamethonium bitartrate, and also an analogue of hexamethonium known at the moment as "M. & B. 1863." The chemistry of this new compound and related derivatives is described by Barber and Gaimster (1951) and the pharmacology by Wien and Mason (1951). It was originally issued as the bromide salt, but now as the bitartrate. Experimentally it is two to four times as active as hexamethonium bromide (C6) as a ganglion-blocking agent, and therefore might be expected to work in smaller dosage by mouth, with possibly a more sustained action. The formulae given below show the relation between M. & B. 1863 and C6.

M. & B. 1863



Hexamethonium Bromide



For our trials M. & B. 1863 was issued in tablets of 125 mg. of the bromide or 175 mg. of the bitartrate, for oral use only; it was also available in solution for injection.

Most patients have received the drug by mouth only, but a few have had increasing subcutaneous or intramuscular injections of hexamethonium bromide or M. & B. 1863. After 48 hours these have been given oral M. & B. 1863. The dose of this compound was increased until a fall in blood pressure occurred or side-effects prevented any further increase. Most of our cases received no M. & B. 1863 from midnight to 6 a.m.

This communication is mainly based on a detailed analysis of our results in the treatment of 14 patients, both as in-patients and as out-patients. Since completing this review, however, we have also given M. & B. 1863 to many others, both as in-patients and as out-patients. We do not feel that these later results have differed in any way from those obtained in the 14 recorded cases. In all we have used the drug in more than 40 cases.

These results and conclusions relate to the long-term treatment of hypertension. We have found that a small intravenous dose (5 mg. of M. & B. 1863) will produce a most dramatic amelioration of dyspnoea in pulmonary oedema and "cardiac asthma" due to left ventricular failure in hypertension (not associated with coronary thrombosis). The results in some cases were infinitely better than when

using morphine and oxygen, and also were more sustained. So-called hypertensive encephalopathy, however, did not respond to this treatment (see for example Case 3 in this paper). This emergency use of the drug is not discussed further here.

The group of 14 patients is made up of two cases of severe rapidly progressive hypertension (albuminuria, papilloedema, slight diminution in renal function), one case of severe hypertension and papilloedema of at least five years' duration, three cases of chronic nephritis with high or very high diastolic pressure, a case of essential hypertension with superimposed toxaemia of pregnancy, and seven cases of essential hypertension with severe subjective symptoms, one associated with diabetes mellitus and hypertensive encephalopathy and the others with recurrent attacks of left ventricular failure and/or hypertensive encephalopathy. All these 14 patients had diastolic pressures of over 120 mm. Hg when treatment was begun, and all but three had diastolic pressures over 150 mm. Hg; in several cases the diastolic pressure frequently exceeded 180 mm. Hg.

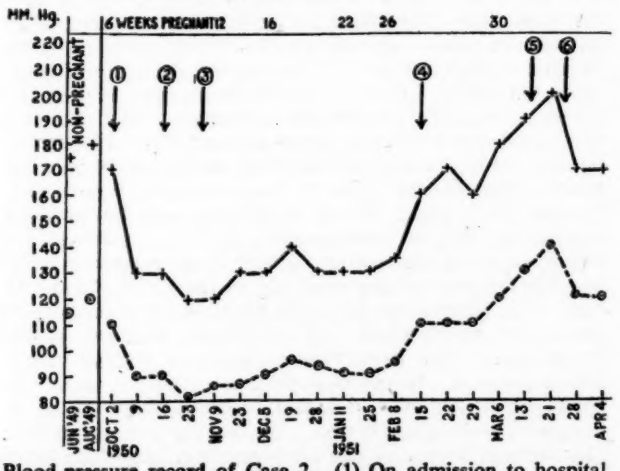
Details are given of four of these cases, as they seem to be of particular interest.

Case 2

A married woman aged 39 had had essential hypertension for many years, with three stillbirths due to superimposed toxaemia of pregnancy. When she became pregnant for the fourth time she was given injections of pentamethonium bromide (C5) at six weeks, and later put on to oral C5. During the middle trimester of pregnancy her blood pressure fell to normal levels, but at the seventh month hypertension reappeared. The oral C5 was increased with no effect on her hypertension. She was then—when her blood pressure had risen to 190/130—given oral M. & B. 1863, and the dose was rapidly increased until she was receiving 250 mg. every one and a half hours. She felt very well, but her blood pressure steadily rose. The foetus was apparently very small for the state of pregnancy.

In spite of increasing doses of M. & B. 1863, and after a further week of treatment, the foetus died. The patient's high blood pressure was maintained for 48 hours until delivery of the macerated foetus and placenta occurred, and it then fell to the previous hypertensive level. At no time did the serum bromide exceed 50 mg. per 100 ml. There was no papilloedema at any stage, and the patient at all times felt very fit and well. During the last six weeks of her illness she remained in bed.

Comment.—In this case it is interesting to note the physiological fall in blood pressure in the middle trimester of pregnancy, and the failure of injected and oral C5 and oral M. & B. 1863 to keep the blood pressure within normal limits. (See accompanying Graph.)



Blood-pressure record of Case 2. (1) On admission to hospital, complete rest in bed. (2) Pentamethonium bromide started. (3) Patient discharged to antenatal clinic on pentamethonium bromide. (4) Readmitted to hospital, complete rest in bed. (5) M. & B. 1863 started. (6) Foetal death *in utero*.

The marked tendency of the blood pressure to fall in the middle trimester of pregnancy in the normal and hypertensive patients (Hare and Karn, 1929; Reid and Teel, 1939; Chesley, Annitto, and Jarvis, 1947; Browne, 1947) and in pregnant hypertensive animals (Page and Ogden, 1939) is quite well known, but we feel it should be emphasized in view of the use of the methonium compounds.

Case 3

A married woman aged 40, one of three cases developing definite papilloedema and albuminuria while receiving hexamethonium bromide or M. & B. 1863 orally, developed recurrent attacks of paroxysmal nocturnal dyspnoea and hypertensive encephalopathy while taking 4 g. of hexamethonium bromide daily. At this time her blood pressure, when she attended the out-patient department, was found to be 260+/180 mm. Hg, and she was immediately readmitted to hospital. After 48 hours of subcutaneous hexamethonium at two-hourly intervals she was given oral M. & B. 1863, and eventually received 250 mg. three-hourly. She was then allowed up. Her blood-pressure level persisted at 180–200/120 mm. Hg, and except for slight episodes of giddiness she felt relatively well.

In the out-patient department two weeks later her blood pressure was 260+/160 mm. Hg, but she felt very well. However, during the 48 hours before attending she had had a recurrence of occipital headache. Intractable constipation alternating with bouts of diarrhoea had been very troublesome. She still had albuminuria and papilloedema and a presystolic gallop. After some weeks her condition began to deteriorate, with no change in her blood pressure, though the dose was increased to 375 mg. seven times daily. She was readmitted in coma with a diastolic pressure averaging 180 mm. Hg, and, though a fall in her blood pressure was produced by intravenous M. & B. 1863, she died 36 hours after admission. In spite of papilloedema, albuminuria, and some diminished renal function, necropsy revealed arteriolosclerosis but no evidence of malignant hypertension.

Case 4

A man aged 60 developed papilloedema, albuminuria, and a higher diastolic pressure (160 to 190 mm. Hg) while receiving 8–10 g. of hexamethonium bromide daily. There was no improvement in his condition at all to increasing doses of M. & B. 1863, and his average blood pressure was actually higher on that drug than it was without it.

Case 6

A married woman aged 35 had active chronic nephritis and severe menorrhagia. Her blood urea was 137 mg. per 100 ml.; standard urea clearance, 20–28% of average normal; urine albumin, 2–4 parts per litre; haemoglobin, 47%; blood pressure, 240–260/130–140 mm. Hg. M. & B. 1863, 125 mg. four-hourly, produced anorexia, nausea, and vomiting, but the diastolic blood-pressure level appeared to have been reduced by 20 mm. Hg. The dose was reduced with relief of her symptoms. The blood pressure did not rise. The urea clearance showed a steady fall, the albuminuria remained constant, and the blood urea rose to more than 270 mg. per 100 ml.

The patient's condition continued to deteriorate slowly, though with cessation of her menorrhagia the haemoglobin increased to 70%. The drug was then discontinued, and during the next six weeks her urea clearance rose by about 10% and her blood urea fell by more than 100 mg. per 100 ml. After a further month, during which she apparently remained fit, her blood urea began to rise again, and two months later she died in uraemic coma. Necropsy revealed chronic nephritis.

Discussion and Review of Results

In this series we did not meet with any case of bromide intoxication or bromide rash. The serum bromide level did not exceed 60 mg. in any case receiving the bromide salt.

Severe constipation was a more pronounced feature than in our past experience with pentamethonium and hexamethonium bromide and hexamethonium bitartrate. However, three patients attending the out-patients department complained of diarrhoea, which would follow several days' intractable constipation. Nausea and vomiting were complained of in six cases and were severe enough to necessitate a reduction in dosage in four cases.

In three patients the mean blood pressure was actually higher whilst the drug was being taken, and in many cases higher peaks of diastolic pressure occurred than during the control period. Increase in lability of the blood pressure was very marked. It was, however, difficult to decide whether this was due to the drug or was a normal feature of the disease.

One patient whose diastolic pressure rose to 170 mm. Hg on 2.0 mg. of M. & B. 1863 three-hourly showed a marked fall when given 250 mg. two-hourly. This fall was associated with gross deterioration in his physical condition and sense of well-being. A spontaneous thrombosis of his axillary artery developed. At this period he had a prothrombin time of 22 seconds (control, 13.5 seconds). Discontinuation of the drug relieved his general malaise, and his blood pressure rapidly rose to its previous level, but in a few days he had obvious congestive heart failure. Routine treatment of his heart failure eventually resulted in great improvement and a "maintained fall in blood pressure." Repeated electrocardiograms, including full unipolar chest leads, showed no evidence of coronary thrombosis, his blood culture was negative, and neither clinically nor radiologically was there any evidence of chronic rheumatic heart disease.

One female patient, in spite of more than five months' continuous treatment with intramuscular and oral hexamethonium bromide, and later with M. & B. 1863, developed what appeared clinically to be the phase of malignant hypertension.

Two out of three chronic nephritic patients whose very high diastolic pressure possibly contributed to their poor renal condition showed some reduction of blood pressure: in one (Case 6) this was associated with deterioration in the renal condition; the other patient was a chronic nephritic with acute exacerbation who was admitted with pulmonary oedema, and whose condition followed the usual course in these cases.

Seven of 14 patients receiving M. & B. 1863 had the same feeling of well-being as those receiving hexamethonium bromide, and this was not related in any way to the fall in blood pressure: in fact, a fall of any significant degree was often associated with a feeling of ill-health.

Five patients showed an unequivocal fall in blood pressure compared with the immediate pre-drug level. One of these died later from severe hypertension while receiving massive doses of the drug; another improved subjectively and objectively on discontinuing the drug, but later died in uraemic coma. In the third case the fall in pressure was associated with marked deterioration of the patient's condition and did not prevent the onset of heart failure a few days later. In the fourth case it was merely the usual result of subsidence of an acute exacerbation of nephritis in a chronic nephritic. The fifth case might represent a genuine therapeutically induced fall in blood pressure, but when followed up in the out-patient department she showed a quick return to her pretreatment level in spite of the continuance of oral therapy.

In several out-patient cases subcutaneous M. & B. 1863, given twice daily, had to be abandoned because of persistent complaints of ill-health and syncope.

We would like again to point out the curious fact that many authorities claim a high incidence of relief of symptoms in hypertension—usually essential or malignant hypertension—with the treatment they propose, without relating this improvement to any fall in blood pressure—for example, the "rice treatment" (Kempner, 1949; Gounelle, Teulon, and Chéroux, 1950)—and Sodi-Pallares and Espino-Vela (1951) quote P. B. Camponovo and J. Masello as demonstrating 31% successful results using vitamin K as a hypotensive agent, with 69% of cases claiming subjective improvement without any fall in blood pressure. Chris (1951), in a follow-up of 35 selected patients submitted to sympathectomy, found that, whereas 25% have maintained a fall in blood pressure, some 66% had been relieved of incapacitating symptoms without any relation to the fall in blood pressure.

Using preparations of *Veratrum viride*, Hite (1946) found that 60% of his patients showed a fall in blood pressure; Freis and Stanton (1948) found a fall in blood pressure in 87%, and subjective relief in 79%, and Wilkins, Stanton, and Freis (1949) had similar results. Coe, Best, and Kinsman (1950), however, found the drug unsatisfactory: most of their patients failed to show a fall in blood pressure; and 64% noted subjective improvement on the drug and 60% on a placebo. McNair, Griffith, and Elek (1950), using a higher dose than Freis and Stanton, did not find any significant fall in blood pressure; and Barrow and Sikes (1951), using a purified extract, found that in only 20% was there a fall in blood pressure which might have been significant. Saville (1950), in her communication on pentamethonium bromide, rather dismisses the blood-pressure effects of the drug, but emphasizes its ability to relieve symptoms; and Turner (1950) wondered whether it might not be better to assess the effect of the drug by the patient's symptomatic relief.

It would seem as though any treatment produces a fall in blood pressure in some 20% to 30% of patients and a symptomatic improvement not related to a fall in blood pressure in 50% to 75% of cases.

It has been suggested in correspondence with one of us (S. L.) that the dosage we have used is too large. Paton (1951, personal communication) would put the odds against this causing therapeutic failure as 1,000 to 1, though there is evidence in animals that tetraethyl-ammonium, by promoting the secretion of adrenaline, may swamp its own ganglion-blocking effect. Experimentally, an increase of the dose of hexamethonium increases its ganglion-blocking effect or its duration, or both. Also, the excretion of these drugs in the urine shows that only a small amount is absorbed from the alimentary canal.

We have not emphasized the symptomatic improvement that can occur in many of these cases. We feel that in the present state of our knowledge of hypertension it would be catastrophic to stress the value of a potentially dangerous drug for the treatment of a disease in which symptomatic improvement often occurs with a placebo. We do not feel that we can accept any result as satisfactory without objective evidence of improvement.

It has been suggested that the small quantity of drug absorbed orally may produce a partial ganglion block which relieves the patient without a fall in blood pressure. Sympathetic vasoconstrictor impulses are not the cause of essential hypertension. Inhibition of these impulses is used as a purely non-specific hypotensive mechanism. In a disease in which, so far as we know, the mechanical effect of the hypertension leads to vascular, cerebral, renal, and myocardial changes that are the cause of the symptoms, it is hard to imagine how relief of the symptoms can be produced without any fall in blood pressure or objective evidence of improvement in the patient, unless these symptoms which are relieved are not due primarily to the raised blood pressure. The supposition of partial ganglion block leads to the rather absurd postulation of the disease state of essential hypertension with hypertensive symptoms without rise of blood pressure. In our opinion it is useless to make these assumptions without producing objective evidence of the suggested underlying changes. We feel that, in hypertension, the value of a drug of this kind—namely, one which blocks the ganglia—can be assessed only by its effect on the blood pressure, and, when hypotension is present, by its relief of symptoms.

TABLE I.—*Case "Pop"*

Date:	M. & B. 1863 30/4	3/5	4/5	5/5	7/5	8/5	9/5	10/5	11/5	12/5	13/5	14/5	15/5	16/5	17/5
Dose in mg.	120	100	0	50	0	500	500	500	1,000	1,000	1,000	1,000	1,750	2,500	3,500
Route of administration	i.m.	s.c.		s.c.		p.o.	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.	p.o.
Amount excreted in 24 hours (mg.)	112	51	5·5	15	0	9	11	21	11	42	43	47	40	149	91
% excreted in 24 hours	93	51		30		1·8	2·2	4·1	1·1	4·2	4·3	4·7	2·3	5·9	2·6

TABLE II.—*Case "New"*

Date:	M. & B. 1863 16/5	18/5	19/5	20/5	21/5	C6 22/5	23/5	24/5	25/5	C5 26/5	27/5	28/5	29/5
Dose in mg.	60	105	0	100	0	140	0	295	0	250	0	300	0
Route of administration	s.c.	s.c.		s.c.		s.c.		s.c.		s.c.		s.c.	
Amount excreted in 24 hours (mg.)	19	233	15	93	44	40	28	214	81·3	140	55	193	123
% excreted in 24 hours	32			93		28		73		56		64	

Date:	M. & B. 1863 30/5	31/5	1/6	2/6	3/6	4/6	5/6	6/6	7/6	8/6	9/6	10/6	11/6	12/6	13/6	14/6
Dose in mg.	105	0	0	150			1,000	0	0	0	0	0	0	2,000	0	0
Route of administration	s.c.			s.c.			p.o.							p.o.		
Amount excreted in 24 hours (mg.)	120			49; 94·6*	45; 0*	14; 10*	17·3; 7·4; 5; 0†	6·0	trace	6·2	0	0	0	219; 168·5; 130·7; 372·3†	110	27
% excreted in 24 hours			14·8				1·4							44·5		

* Excretion during 12-hour periods. † Excretion during 6-hour periods. i.m.=intramuscularly. s.c.=subcutaneously. p.o.=by mouth. C6=hexamethonium. C5=pentamethonium.

TABLE III.—*Case "Ho"*

Date:	M. & B. 1863 4/5	8/5	9/5	10/5	11/5	12/5	13/5	14/5	15/5	16/5	C6 17/5	18/5	19/5	20/5	21/5	22/5	C5 23/5
Dose in mg.	1,875 (15 tabs)	95 (1·9 ml.)	0	220 (4·4 ml.)	330 (6·6 ml.)	0	120 (2·4 ml.)	0	180 (3·6 ml.)	0	100	0	180	0	180	0	270
Route of administration	p.o.	s.c.		i.v.*	i.v.*		s.c.		s.c.		s.c.		s.c.		s.c.		s.c.
Amount excreted in 24 hours (mg.)	143	194	50	430	308	122	99	32	230	32	119	22	360	8	103	14	177
% excreted in 24 hours	7·6				94		82								57		66

* Intravenous drip.

TABLE IV.—*Five Cases Treated with M. & B. 1863*

Date:	Case "Free" 18/5	19/5	22/5	Case "Hins" 18/5	19/5	22/5	Case "Web" 18/5	19/5	20/5	21/5	22/5	23/5	Case "Con" 30/4	16/5	Case "Han" 8/5
Dose in mg.	1,000	0	50	1,000	0	30	1,000	1,000	1,000	1,000	0	0	1,400	3,500	1,760
Route of administration	p.o.		s.c.	p.o.		s.c.	p.o.	p.o.	p.o.	p.o.			p.o.	p.o.	p.o.
Amount excreted in 24 hours (mg.)	1·9	10	4	338	11	7	47	39	46	67	40	12	336	176	13·0
% excreted in 24 hours	0·2		8	33·8		22	4·7	3·9	4·6	6·7			24	5	0·74

The difference between our results and those of authors who used the drug only by injection (Smirk, 1950) may be due to the fact that in our previous communication (Locket *et al.*, 1951) and in the present one we have depended mainly upon oral administration of the hexamethonium derivatives. However, our experience with continuous intravenous drip and subcutaneous and intramuscular administration of the methonium compounds does not make us feel any more optimistic about our ability to produce a sustained lower blood pressure unless the injections are given at very frequent intervals and the patients are kept *immobile and erect*. The answer to the different immediate results may lie in the inadequate absorption of the methonium compounds when given by mouth (Milne and Oleesky, 1951).

The different rates of absorption of the drug and the different percentages absorbed when given by different routes form one of the factors accounting for the variability of results. Some of these results are briefly discussed by Wien and Mason (1951). One thing is certain after consideration of these figures—namely, that it is entirely impossible to predict the percentage absorbed or the rate of absorption when the drug is given orally. Even were it possible to predict the response to any given dose "absorbed" by any route and thus to grade the response, it would be impossible to do this with the oral method. The figures in Tables I–V illustrate this better than words, and make it impossible for one to understand how any clinicians can obtain consistent results when giving the drug by mouth, and how they can claim even to adjust the response by alteration in the oral dose.

Thus Table IV shows that Case "Free" with clinical uraemia excreted only 0.2% of the oral and 8% of the subcutaneous dose, yet Case "Hins," with just as advanced renal disease, excreted 33.8% of the oral and 22% of the subcutaneous dose. Case "Con," with simple hypertension, excreted 24% of 1,400 mg. and only 5% of 3,500 mg. given orally. Case "New" (Table II) excreted 1.4% in 24 hours of a single oral dose of 1,000 mg. and 2.1% of the dose in

TABLE V.—*Three Cases Treated with C6 Bitartrate*

Date:	Case "Dub" 18/5	Case "Simp" 20/5	Case "Saw" 3/5
Dose in mg.	5,950	2,000	3,500
Route of administration	p.o.	p.o.	p.o.
Amount excreted in 24 hours (mg.)	734	119	396
% excreted in 24 hours	12·3	5·9	11·3

four days, whereas she excreted 44.5% in 24 hours of a single dose of 2,000 mg. given orally and 56.4% in three days. This latter dose was associated with syncope, ileus, and urinary retention. Case "Pop" (Table I) showed a daily excretion of 1.1% to 4.7% of 1,000 mg., but 5.9% of 2,500 mg. and 2.6% of 3,500 mg. given in single doses orally. Subcutaneous administration usually showed excretion figures of 80% in 24 hours, but even these varied from 30% or less to over 80% in the same patient.

When the daily excretion figures exceeded the dose administered, it was because of delay in excreting a dose of drug often given many days earlier. The figures quoted in this paper can be repeated many times from other records.

This failure and delay in absorption might account for the disparity of our results with groups receiving the drug by injection only (Smirk, 1950; Restall and Smirk, 1950), as we have found that the drug is removed from the blood almost as fast as it is injected. It was impossible, with the methods available to us at the time, to estimate blood levels of the methonium compounds, even when blood samples were taken whilst the drug was given by intravenous drip. This failure in intestinal absorption would not account for the difference between our results and those of the series receiving the drug only or mainly by mouth (Campbell and Robertson, 1950; Frankel, 1951).

We have produced an unequivocal maintained fall in blood pressure in one patient treated with oral hexamethonium bromide (and quoted in our earlier communication) and one patient treated with M. & B. 1863, and there were also four doubtful cases with M. & B. 1863—this out of a total of more than 90 patients treated with the drugs, mainly orally, and in spite of the fact that many of our hexamethonium bromide series of patients have now had this drug or M. & B. 1863 for more than a year.

In view of the dangers associated with injection of the drug and the poor and very variable absorption when given by mouth, we consider that further trial of the methonium compounds at present available should be restricted to hospital patients receiving it by injection. Further, that oral use of the drugs is of little value, and, with variable absorption associated with the possible storage of large amounts of the drug in the inert bowel, it might be extremely dangerous in patients not treated in hospital. We have a fair amount of evidence to suggest that oral administration of the drug always causes some degree of intestinal stasis before any reasonable amount of absorption can occur (see Case "New" in Table II). This ileus may be associated with a persistent hypotension because of delayed passage of the drug along the gut and therefore continuance of absorption. There does not appear to be any record of ileus occurring unless the methonium compound is given by mouth, and all recorded fatal cases of this condition were associated with oral administration of the drug.

In conclusion, we ourselves have abandoned the oral use of these compounds in the treatment of any variety of hypertension. We feel that at the moment a regime of rest in bed, sedation, and a salt-free diet is still the safest and most universally applicable method of treatment. However, the continued investigation of the methonium compounds under strict clinical control in hospital centres where there is a full appreciation of the natural variation of hypertension in those diseases in which it occurs is, in our opinion, more than ever necessary in order to obtain a complete picture of the possible restricted field where their administration may be of value.

Summary

M. & B. 1863, an analogue of hexamethonium, was tried orally in several severe cases of hypertension due to essential or malignant hypertension, toxaemia of pregnancy, or chronic nephritis. In none of these cases had there been previously an appreciable fall in blood pressure on rest in bed and ancillary treatment without the hexamethonium derivative.

These detailed results, discussed in the light of more extensive experience, were no more satisfactory than with oral pentamethonium bromide or hexamethonium bromide or bitartrate.

Spontaneous thrombosis of the axillary artery occurred in one patient receiving M. & B. 1863, and another patient apparently developed malignant hypertension while taking it by mouth.

Rest and M. & B. 1863 in combination appeared to produce a fall in blood pressure in five patients: two with chronic nephritis, one of whom is now dead; one in whom the fall in blood pressure was associated with marked general malaise and giddiness followed by congestive heart failure; and two in whom there was, later, a recurrence of symptoms and increase in blood pressure, with death in one case.

In a case of toxaemia of pregnancy associated with essential hypertension, in spite of the proved lability of the blood pressure, intramuscular pentamethonium bromide, oral pentamethonium bromide, and oral M. & B. 1863 failed to produce any improvement or prevent death of the foetus for the fourth time.

Absorption, blood levels, and excretion of the methonium compounds are briefly discussed.

We are grateful to Drs. R. Wien and D. F. J. Mason, of the biological division of May & Baker Ltd., for numerous estimations of the urine content of methonium compounds; to our ward sisters for loyal co-operation in this work; and to Drs. J. Lister, J. Angus, L. G. Collins, R. G. Davies, and A. R. Taylor, without whose help nothing could have been done. We would also like to thank Mr. R. E. Frizzell, our chief pharmacist, for his help and advice, and Messrs. May & Baker Ltd. for the supply of the drug that made this investigation possible. The skilled biochemical assistance of Mr. T. Baker and secretarial assistance of Mrs. E. D. Price have relieved us of many a burden and enabled this work to be completed. Owing to shortage of space more detailed protocols and tables of these 14 cases have had to be omitted, though they are available.

REFERENCES

Arnold, P., and Rosenheim, M. L. (1949). *Lancet*, **2**, 321.
Ayman, D. (1930). *J. Amer. med. Ass.*, **95**, 246.
Banton, A. H. (1951). *Lancet*, **1**, 527.
Barber, H. J., and Gaimster, K. (1951). *J. Pharm. Pharmacol.*, **3**, 663.
Barrow, J. G., and Sikes, C. R. (1951). *Amer. Heart J.*, **41**, 742.
Browne, F. J. (1947). *British Medical Journal*, **2**, 283.
Campbell, A., and Robertson, E. (1950). *Ibid.*, **2**, 804.
—— —— (1951). *Lancet*, **1**, 797.
Camponovo, P. B., and Masello, J. (1951). Quoted by Sodi-Pallares and Espino-Vela (1951).
Chesley, L. C., Annitto, J. E., and Jarvis, D. G. (1947). *Amer. J. Obstet. Gynec.*, **53**, 851.
Chris, S. M. (1951). *British Medical Journal*, **1**, 665.
Coe, W. S., Best, M. M., and Kinsman, J. M. (1950). *J. Amer. med. Ass.*, **143**, 5.
Frankel, E. (1951). *Lancet*, **1**, 408.
Freeman, Z. (1950). *British Medical Journal*, **2**, 1496.
Freis, E. D., and Stanton, J. R. (1948). *Amer. Heart J.*, **36**, 723.
Gounelle, H., Teulon, H., and Chéroux, R. (1950). *Bull. Soc. méd. Hôp. Paris*, **66**, 327.
Hare, D. C., and Karn, M. N. (1929). *Quart. J. Med.*, **22**, 381.
Hirson, C., and Kelsall, A. R. (1951). *Lancet*, **1**, 586.
Hite, W. K. (1946). *Illinois med. J.*, **90**, 336.
Holt, M. C., and Litchfield, J. W. (1951). *Lancet*, **1**, 347.
Kay, A. W., and Smith, A. N. (1950). *British Medical Journal*, **2**, 807.
—— —— (1951). *Gastroenterology*, **18**, 503.
Kempner, W. (1949). *Ann. intern. Med.*, **31**, 821.
Locket, S., Swann, P. G., and Grieve, W. S. M. (1951). *British Medical Journal*, **1**, 778.
McNair, J. D., Griffith, G. C., and Elek, S. R. (1950). *Amer. Heart J.*, **40**, 382.
Milne, G. E., and Oleesky, S. (1951). *Lancet*, **1**, 889.
Organe, G., Paton, W. D. M., and Zaimis, E. J. (1949). *Ibid.*, **1**, 21.
Page, E. W., and Ogden, E. (1939). *Amer. J. Obstet. Gynec.*, **38**, 230.
Paton, W. D. M. (1951). *British Medical Journal*, **1**, 773.
—— and Zaimis, E. J. (1949). *Brit. J. Pharmacol.*, **4**, 381.
Reid, D. E., and Teel, H. M. (1939). *Amer. J. Obstet. Gynec.*, **37**, 886.
Restall, P. A., and Smirk, F. H. (1950). *N.Z. med. J.*, **49**, 206.
Rosenheim, M. L. (1951). *Lancet*, **1**, 347.
Saville, S. (1950). *Ibid.*, **2**, 353.
Smirk, F. H. (1950). *N.Z. med. J.*, **49**, 637.
—— (1951). *Amer. Heart J.*, **42**, 530.
Sodi-Pallares, D., and Espino-Vela, J. (1951). *Ibid.*, **41**, 626.
Sommerville, J., and Allan, J. (1951). *British Medical Journal*, **1**, 864.
Turner, R. (1950). *Lancet*, **2**, 358.
Wien, R., and Mason, D. F. J. (1951). *Brit. J. Pharmacol.*, **6**, 611.
Wilkins, R. W., Stanton, J. R., and Freis, E. D. (1949). *Proc. Soc. exp. Biol., N.Y.*, **72**, 302.

Medical Memorandum

A Case of Schönlein-Henoch (Anaphylactoid) Purpura Treated with A.C.T.H.

The anaphylactoid nature of the syndrome associated with the names of Schönlein and Henoch was first suggested by Osler (1914). It is now generally agreed that sensitization to the haemolytic streptococcus is the basis of the pathology. Histologically the lesion consists of an inflammation involving the terminal arterioles. The presenting symptom in any individual case is determined by the site of the arterioles most severely affected. Gairdner (1948) has pointed out the similarity between the arteriolar lesion in anaphylactoid purpura and the lesion seen in larger vessels in periarteritis nodosa.

A.C.T.H. is of proved value in a variety of allergic states—asthma, drug sensitivities, hay-fever, giant urticaria of unknown origin, contact dermatitis, etc. (Bordley *et al.*, 1949). In periarteritis nodosa improvement has occurred during the administration of A.C.T.H. (Goldman *et al.*, 1950; Stillman, 1950; Shick *et al.*, 1950). The renal lesion in the Schönlein–Henoch syndrome is indistinguishable clinically from that of acute nephritis in which modification of the course of the disease has been reported following the administration of A.C.T.H. (Farnsworth, 1950). There were reasons, therefore, to expect that the hormone might prove of value in anaphylactoid purpura, which has features common both to the allergic states and to periarteritis nodosa.

The following is a report of a case of Schönlein–Henoch syndrome treated with A.C.T.H.

Case Report

A boy aged 3½ was admitted to the Derbyshire Hospital for Sick Children on November 23, 1950. Some five weeks previously he had had a sore throat, with pyrexia and cervical adenitis. Ten days later a purple rash appeared on the thighs and buttocks and he had a persistent severe colicky abdominal pain. Fresh crops of spots occurred prior to his admission, and he had painful swellings of the knees, right hand, and axilla, and painless swellings of the forehead and nose.

On admission his temperature was raised. He had widespread raised purplish macules on the limbs and buttocks and some true purpura. The right wrist was swollen, and at the base of the nose there was a diffuse area of oedema. Tonsils were enlarged but not acutely inflamed. No other abnormal physical signs were seen.

Laboratory Investigations.—Blood count: Hb, 83%; red cells, 3,780,000; white cells, 8,000 (eosinophils 4%, neutrophils 38%, old metamyelocytes 5%, leucocytes 47%, monocytes 6%); platelets, 426,000. Bleeding and clotting times normal; prothrombin time, 19 seconds; E.S.R., 12 mm. in first hour. The urine contained a small amount of albumin, a few granular casts, red cells up to 12, and white cells up to 6 per high-power field of centrifuged deposit. Blood urea, 29 mg. per 100 ml. Stools contained occult blood.

The abdominal pain continued, and fresh crops of the exanthem appeared at intervals of a few days. The stools and urine showed increasing amounts of blood.

Treatment.—A.C.T.H., 5 mg. six-hourly, was started on December 8. On the 19th it was increased to 10 mg. six-hourly, and on the 22nd to 15 mg. six-hourly. Treatment was discontinued on December 27. A total of 640 mg. of the hormone was therefore given over a period of 19 days. During that time the child received a low salt diet and potassium chloride, 0.5 g. daily. Daily blood-pressure readings and eosinophil counts were made. Spot blood-sugar estimations were carried out at the same time daily, and electrocardiograms were taken twice weekly. The eosinophil count fell from 4% of 8,000 cells to zero in two days, and did not rise again above 1.5% during treatment. The blood pressure, blood sugar, and electrocardiogram remained normal. There was no increase in weight or any personality change.

Progress

Fresh crops of purple macules developed on December 12, 16, and 22. Severe abdominal pain occurred on December 17 and 22, though there were a few days when pain was not present. The albuminuria showed no improvement. On December 12 the Addis count showed: red cells, 99,000,000; white cells, 10,000; granular casts, 2,100,000; hyaline casts, 100,000. On the 18th the Addis count showed: red cells, 324,000,000; white cells, 65,000; granular casts, 4,400,000; hyaline casts, 1,540,000.

After the cessation of treatment the abdominal pain became gradually less severe and the stools were clear of occult blood for the first time on February 10, 1951. Fresh crops of the exanthem continued to occur until he was discharged from hospital on February 12, and he has had further relapses since. Frank haematuria occurred after treatment and since discharge. One relapse on February 28 was associated with an attack of follicular tonsillitis. An intercurrent urinary infection caused by a penicillin- and sulphathiazole-resistant strain of *Bact. coli* cleared on streptomycin.

When last seen in April, 1951, he had no rash, joint swelling, or abdominal pain. The urine contained a large amount of albumin, and the centrifuged deposit showed numerous granular casts, about 100 red cells per high-power field, and moderate numbers of blood casts. The child's general condition was good and he had gained 2½ lb. (1.1 kg.) in weight since discharge.

Comment

The course of the illness was typical of that usually seen in a moderately severe case of the Schönlein–Henoch syndrome. There is nothing to suggest that A.C.T.H. modified the course of the disease in any way. During treatment fresh crops of the skin lesion occurred, the abdominal pain persisted, and the urinary findings deteriorated.

While this child was being treated another case in which A.C.T.H. had been used was reported (Stefanini *et al.*, 1950). Their case, that of a boy of 3 years, was comparable with mine, but the dosage employed was smaller. During 14 days of treatment with 5 mg. of A.C.T.H. thrice daily his abdominal pain subsided, but some fresh skin lesions appeared and the red cells persisted in the urine. Further skin lesions and abdominal pain occurred six days after the cessation of treatment. This child was also left with albuminuria, haematuria, and cylinduria five months after treatment. There is little doubt that the failure to respond was not due to a failure of the hormone to stimulate the adrenal cortex, since the eosinophils disappeared from the blood in my case and a personality change occurred in the case reported by Stefanini *et al.*

It is considered that so long as the hormone remains in short supply its further use in this condition is not justified.

E. J. S. WOOLLEY, M.B., M.R.C.P.,
Physician, Derbyshire Hospital for Sick Children.

References

Bordley, J. E., Carey, R. A., Harvey, A. McG., Howard, J. E., Kattus, A. A., Newman, E. V., and Winkenwerder, W. L. (1949). *Bull. Johns Hopk. Hosp.*, **85**, 396.
Farnsworth, E. B. (1950). *Proc. Soc. exp. Biol., N.Y.*, **74**, 57.
Gairdner, D. (1948). *Quart. J. Med.*, **17**, 95.
Goldman, R., Adams, W. S., Beck, W. S., Levin, M., Bassett, S. H., and White, A. (1950). *Proc. First Clinical A.C.T.H. Conference*, p. 437. Philadelphia.
Osler, W. (1914). *British Medical Journal*, **1**, 517.
Shick, R. M., Baggenstoss, A. H., and Polley, H. F. (1950). *Proc. Mayo Clin.*, **25**, 135.
Stefanini, M., Roy, C. A., Zannos, L., and Damshek, W. (1950). *J. Amer. med. Ass.*, **144**, 1372.
Stillman, J. S. (1950). *Proc. First Clinical A.C.T.H. Conference*, p. 445. Philadelphia.

Reviews

ANY QUESTIONS?

Any Questions? A Selection of Questions and Answers published in the *British Medical Journal*. (Pp. 240. 7s. 6d.) London: British Medical Association. 1951.

This book, as every reader of the *Journal* knows, has been compiled from the answers given to "Any Questions?" over the last eight years. The difficulties in running a column of this kind are great. The editor must have a panel of experts who are not only knowledgeable but tactful. From reading between the lines it is apparent that a certain proportion of the inquiries relate to the questioners or, even more difficult, to their wives. What treatment would be beneficial in a case of inoperable carcinoma of the stomach? It is no good to answer, None. Moreover, the general body of readers of the *Journal* take a delight in finding the experts at fault and reporting their errors in the correspondence columns. Few of the questions can be answered without a careful check, and access to a large reference library is necessary. Some of the questions are about common knowledge, but at other times extensive research may be required for an answer, particularly to questions in the paramedical fields. However, the problems which most often induce recurrent hunger for information in practising doctors are everyday things which are not well discussed in textbooks and are not included in the standard descriptions of disease, such as sore mouths, cleaning of medicine bottles, sexual disappointments, and morbid human behaviour.

The series has been so successful that repeated demands were received for a selection of the answers to be published. In this first book they have been fairly evenly apportioned over the whole field of medicine, so that there is something to everyone's taste. However, one misses any of the answers to psychiatric problems, which are perhaps the favourite of connoisseurs of "Any Questions?", varying, as they do, so inexplicably from the cold douche to the attitude of *tout pardonner*. It is to be hoped that this will be remedied in the further volumes which are promised. The book does not pretend to be a medical dictionary but rather a breviary for occasional reading. It is not to be read at one sitting, or its abrupt transitions, as from "Dynamite Headache" to "Leopard Injuries," may be confusing. It is small enough and cheap enough to be carried in the pocket and read during those periods of waiting which come to all of us, however busy our days.

L. J. WITTS.

GLUTEAL EVOLUTION

Cold Spring Harbor Symposia on Quantitative Biology. Volume XV. (Pp. 425; 53 figures and 3 plates. $7.) Cold Spring Harbor, New York: The Biological Laboratory. 1950.

Much of this book is, inevitably, either a summary of known facts or a publication of new ones which may ultimately throw light on the central problem. But one article makes what may be an outstanding contribution to the problem of human evolution. Whether the Australopithecines were our ancestors or not, they make it highly probable that our ancestors started walking, and thus liberated their hands, before their brains reached human size. Washburn points out that in monkeys the gluteus maximus is smaller than the gluteus medius, and that even in the great apes it is an abductor of the thigh. In man, thanks to a shortening and bending back of the ilium, it has become an extensor, and is essential for the erect posture. The view that gluteal evolution preceded cerebral and was a prerequisite of it may be as humiliating to our pride as was Darwin's theory to that of our great-grandparents; but it may be true. Only less revolutionary is the opinion of the systematist Mayr that, if man and his relatives were classified on the same principle as insects, only three species would be recognized, *Homo sapiens*, including modern and Neanderthal man, *H. erectus*, including *Pithecanthropus* and *Sinanthropus*, and *H. transvaalensis*, including the Australopithecines. At no time, in Mayr's view, was there more than one human species. Schultz's review of the comparative anatomy of man and the apes contains many points which should interest anatomists.

Most of the book deals with human populations and their genetics. Kemp's statistics on congenital diseases in Denmark are the most accurate available for any human community. Neel discusses the fascinating problem of Cooley's anaemia, almost confined to Italians and Greeks, and sickle-cell anaemia, a peculiarity of negroes. Their inheritance is fairly well understood, but we do not understand why natural selection has not eliminated them. If we did we should know a good deal more about congenital disease in general, about human evolution, and about the possibility of negative eugenics.

The British haematological school was well represented by Race and Mourant, the latter of whom bases a racial history of the Mediterranean peoples on their blood groups and types. The longest paper in the book is a still more ambitious attempt by Birdsell to base a history of the Australian natives on their blood characters, measurements, hair colour, and presence of supernumerary molars (in one case a fifth). Posterity will decide whether he has made a real advance in method or raised a pyramid of speculation on a rather narrow basis.

Students of human variation will find data on topics including the numbers of circumvallate papillae, the pattern of the superficial anterior thoracic veins, supernumerary and missing teeth, osteoporosis in ancient Greece, and the variability of the great apes. Classical anthropometry is less stressed than it would have been twenty years ago, and perhaps less than it will be twenty years hence. Several papers, including one by Sheldon, deal with the highly controversial topic of somatotyping.

The standard of printing is very low for the price of the book. But the book does give a wide view of a variety of important problems, and no anatomist or anthropologist will be the worse for dipping into it.

J. B. S. HALDANE.

VARICOSE VEINS

The Treatment of Varicose Veins and their Complications. By Stanley Rivlin. (Pp. 56; illustrated. 10s. 6d.) London: William Heinemann Medical Books. 1951.

This small book is based on the author's essay which was awarded the Hunterian Society's Gold Medal in 1950. In the first half of the book he discusses the anatomy, classification, symptoms, and signs of varicose veins, and in the second half the various aspects of treatment. This has meant a considerable degree of compression in some directions and omission in others, and an over-simplification of many of the problems. The author believes that the "immediate" cause of varicosities is a congenital maldevelopment of the valves at the junctions between the superficial and deep veins of the legs. The clinical examination of all possible types of valvular incompetence is therefore described in great detail, and is very fully illustrated. But factors other than purely developmental ones may be involved. In women veins tend to appear at three periods of life—in adolescence, in the first two or three months of pregnancy, and occasionally at the menopause—all of which are periods of endocrine stress. The hereditary factor in varicose veins is undoubted, but where does it operate?—on the venous valves, on the vein walls, or via the endocrine system? It is possible, by taking too purely a mechanical view, to oversimplify the problems and to narrow the range of treatment. In any case, in practice the presence of much subcutaneous fat only too often makes the interpretation of clinical tests very difficult by masking many varicosities.

The treatment recommended is by means of ligations at sites of venous backflow, retrograde injections, and subsequent injections if required. The author is critical of injection treatment in the presence of venous backflow, but

there are certainly many borderline cases where intensive injection treatment may be very effective if carried out thoroughly, and it may avert operation.

The author discusses ulceration in some detail, but covers eczema and phlebitis in a few lines. It is certain that complicated cases in which ulceration; eczema, and phlebitis are all present call for the greatest resourcefulness and skill, since they will not respond to simple methods. It should be made clear that "elastoplast" types of adhesive dressings should never be used on patients with eczema. The second sentence of the book refers to "Celus"; surely "Celsus" is intended.

REGINALD T. PAYNE.

CORROBORATION IN PSYCHO-ANALYSIS

Essays in Applied Psycho-analysis. Volume II. By Ernest Jones, M.D., F.R.C.P. Essays in Folklore, Anthropology, and Religion. International Psycho-analytical Library No. 41. (Pp. 383. £1 1s.) London: The Hogarth Press. 1951.

This second volume of collected essays in applied psycho-analysis differs from the first in a number of ways. It is concerned exclusively with themes of folklore, anthropology, and religion, a fact which to some extent restricts its general appeal. And, whereas in the first volume the author applied psycho-analytical findings to a variety of cultural fields and problems, in the most important papers in this collection he is more concerned to corroborate psycho-analytical findings by assembling and correlating a vast quantity of anthropological observations. This is not at all surprising when one recalls that his two important essays on the symbolic significance of salt and on the Madonna's Conception through the ear were written between 1912 and 1914—at a time, that is, when psycho-analytical findings about the Oedipus complex provided at the same time a source of profound scepticism and a focus for the most strenuous opposition.

These two essays, together with shorter papers on "The Sexual Ignorance of Savages" and "A Study of the Holy Ghost Concept," are permanent witnesses to Dr. Jones's anthropological acumen and industry as well as to his gifts of exposition. The other essays are in fact mainly expository and to a certain extent propagandist. But the volume as a whole demonstrates convincingly not only that psycho-analytical methods are capable of vitalizing anthropological research, but also that anthropological research is essential to corroborate those psycho-analytical surmises and reconstructions which cannot be supported by direct analysis of case-material.

EDWARD GLOVER.

CLINICAL PATHOLOGY

Panton and Marrack's Clinical Pathology. 6th ed. By H. B. May, M.A., M.D., M.R.C.P., and J. R. Marrack, M.A., M.D. (Pp. 512; 44 illustrations. £1 10s.) London: J. and A. Churchill. 1951.

A book on clinical pathology may be anything from a side-room primer to a vast compendium in which are described in detail every recognized diagnostic test and even such things as the life histories of uncommon helminths. "Panton and Marrack" strikes a happy mean, and in its new and much revised form comprises separate main sections on haematology, chemical pathology, and bacteriology; histology has been eliminated except for a chapter on methods. Outside experts have contributed material on highly specialized subjects; these include fungi and animal parasites. In the section on parasites the use of the term "natural size" in legends to illustrations may mislead: it seems to suggest, for instance, that a hookworm ovum is about the size of a coffee bean.

The later chapters on how to examine specimens and to investigate common clinical states (why no mention of Vincent's infection under "sore throat"?) are perhaps the most useful, since they belong most properly to the subject and are not to be found elsewhere. In view of the book's size and the inclusion of ten colour plates among its many illustrations, the price is reasonable.

L. P. GARROD.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

The Management of Fractures, Dislocations, and Sprains. By J. A. Key, B.S., M.D., and H. E. Conwell, M.D., F.A.C.S. 5th ed. (Pp. 1,232. 115s.) London: Henry Kimpton. 1951.

Autobiography of a Schizophrenic. (Pp. 64. 5s.) London: J. Baker. 1951.

Leprosy. By Sir Leonard Rogers, K.C.S.I., C.I.E., M.D., F.R.C.P., F.R.C.S., F.R.S., I.M.S., and E. Muir, C.M.G., C.I.E., M.D., F.R.C.S.Ed., Addendum to the 3rd ed. (Pp. 16. 2s. 6d.) Bristol: John Wright. 1951.

Sons and Daughters. By R. Pilkington. (Pp. 214. 18s.) London: George Allen and Unwin. 1951.

Guy's Hospital, 1725-1948. Edited by H. A. Ripman. (Pp. 176. 18s. 6d.) London: Gazette Office, Guy's Hospital. 1951.

The Practice of Endocrinology. Edited by R. Greene, M.A., D.M., M.R.C.P. 2nd ed. (Pp. 389. 65s.) London: Eyre and Spottiswoode. 1951.

Diabetes Control. By E. L. Bortz, M.D. (Pp. 264. 25s.) London: Henry Kimpton. 1951.

Soviet Genetics. By A. G. Morton, B.Sc., Ph.D. (Pp. 174. 15s.) London: Lawrence and Wishart. 1951.

Isotopes in Biochemistry. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch. (Pp. 288. 27s. 6d.) London: J. and A. Churchill. 1951.

Hypertension. Edited by E. T. Bell, M.D. (Pp. 573. 60s.) London: Geoffrey Cumberlege. 1951.

Marriage. By K. Walker, F.R.C.S. (Pp. 136. 8s. 6d.) London: Secker and Warburg. 1951.

The Development of Reasoning in Children with Normal and Defective Hearing. By M. C. Templin. (Pp. 143. 24s.) London: Geoffrey Cumberlege. 1951.

Surgery of the Stomach and Duodenum. By C. E. Welch, M.D. (Pp. 349. 65s.) London: Interscience Publishers Limited 1951.

A General Zoology of the Invertebrates. By G. S. Carter. 3rd revised ed. (Pp. 421. 35s.) London: Sidgwick and Jackson. 1951.

Vitamins. By L. J. Harris, Sc.D., D.Sc., Ph.D., F.R.I.C. (Pp. 244. 15s.) London: J. and A. Churchill. 1951.

Medical Bacteriology. By Sir Lionel Whitby, C.V.O., M.A., M.D., F.R.C.P., D.P.H., and M. Hynes, M.D., M.R.C.P. 5th ed. (Pp. 544. 22s. 6d.) London: J. and A. Churchill. 1951.

Ugo Benzi. By D. P. Lockwood. (Pp. 441. 60s.) London: Cambridge University Press. 1951.

The Genetics of Micro-Organisms. By D. G. Catcheside. (Pp. 223. 21s.) London: Sir Isaac Pitman. 1951.

Calendar of the Pharmaceutical Society of Great Britain, 1951-52. (Pp. 308. 12s. 6d.) London: The Pharmaceutical Press. 1951.

History of Medicine in Ireland. By J. Fleetwood, M.B., D.P.H. (Pp. 420. 21s.) Dublin: Browne and Nolan. 1951.

Adelaide Hospital Centenary Book. (Pp. 131. No price.) Dublin: The Parkside Press. 1951.

Pathological Firesetting (Pyromania). By N. D. C. Lewis and H. Yarnell. (Pp. 437. $10.) New York: Coolidge Foundation. 1951.

Équilibre Minéral et Santé. By J. Favier. (Pp. 403. 800 francs.) Paris: Librairie le François. 1951.

Advances in Tuberculosis Research. Edited by H. Birkhäuser and H. Bloch. Vol. 4. (Pp. 308. 43.70 Swiss francs.) Basle: S. Karger. 1951.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY FEBRUARY 2 1952

SYMPATHECTOMY FOR CEREBRAL ISCHAEMIA

Many of the earlier experimental studies of the vasomotor control of cerebral blood vessels had negative results, and physiologists were obliged for many years to admit that no certain evidence of the existence of functioning vasomotor nerves could be found. Perhaps the chief reason for this was the confusing passive alteration in size of cerebral vessels which occurred through changes in systemic blood pressure. Anatomists, however, could show that sympathetic fibres supplied the vessels, and they found it difficult to believe that they were functionless. More recent physiological work has shown that these nerve fibres can in fact alter the diameter of cerebral blood vessels. Forbes and Wolff[1] observed the vessels on the brain surface through glass windows in the skulls of experimental animals and found that stimulation of the cervical sympathetic caused constriction and of the vagus dilatation. Other workers have confirmed these findings, and it is now generally agreed that the cerebral vessels are under vasomotor nervous control, though to a lesser degree than the small vessels of the limbs.

Many attempts have been made to help patients with cerebral lesions by operations on the sympathetic nerve supply to the brain. Penfield[2] has observed cessation of arterial pulsation in the brain during epileptic seizures, and as long ago as 1889 Alexander,[3] of Liverpool, performed a sympathectomy for the relief of epilepsy. Further work on epilepsy was disappointing, and White,[4] after a careful trial, concluded that the operation was without benefit. Vasomotor factors are believed to play a large part in migraine because of the visual cortical effects that occur and because the experimental work of Clark and his colleagues[5] showed that changes in the dural vessels could cause headache. The route taken by the nervous factors initiating the vascular changes is still uncertain. They probably do not travel by the cervical sympathetic chain, for White's efforts to treat migraine by procaine block or sympathectomy have been disappointing. He advises, however, that procaine injection of the stellate ganglion should be tried. If it is unsuccessful, ligation of the middle meningeal and temporal arteries combined with partial section of the trigeminal root should be performed in severe cases. Operations for the relief of the fainting attacks and convulsions which occur in some individuals through mechanical stimulation of an abnormally sensitive carotid sinus have met with more definite success than those for epilepsy or migraine. Their aim has been to eliminate the general vasodilator and cardiac depressor impulses which, arising in the carotid sinus, cause cerebral ischaemia through a fall in blood pressure.

Professor Leriche, whose imaginative approach to neurovascular surgery is as fresh and stimulating as ever, writes in this issue of his experience in the treatment of cerebral thrombosis and embolism. He has treated his patients by cervical sympathectomy, stellate ganglion block (which he prefers), and in some cases by carotid periarterial denervation or resection of damaged segments of the carotid artery. He has been guided here, as in his approach to arterial disease elsewhere, by the concept of reflex nervous activity causing spasm of the vessels in the region of a damaged artery. Such a damaged arterial segment should be excised, or, if this is not possible, regional sympathetic denervation carried out. This concept is, as Leriche says, difficult to test experimentally. The beneficial results of sympathectomy can be explained in other ways than by release of spasm. Normal vasomotor tone in the collateral vessels around an area of thrombosis may be lessened, or an increased amount of blood may flow through the collaterals because the more distal vessels become dilated. Edholm and his colleagues[6] have shown that the resting blood flow in limbs with thrombosed arteries may actually be increased rather than diminished, as would be expected if spasm existed in the collaterals. Pickering,[7] in a general review of vascular spasm, warns against its too easy acceptance as an explanation of symptoms of disease. He believes that transient cerebral symptoms in hypertensive patients may be better explained by organic obstruction, such as would occur with arteriolar necrosis or thrombosis followed by the rapid development of a collateral circulation. Sympathectomy would be expected to assist such a process by dilating the collateral vessels.

1 *Arch. Neurol. Psychiat., Chicago*, 1928, **19**, 1057.
2 *Ann. intern. Med.*, 1933, **7**, 303.
3 *The Treatment of Epilepsy*, Edinburgh, 1889.
4 *The Autonomic Nervous System*, 1941, New York.
5 *Arch. Neurol. Psychiat., Chicago*, 1936, **35**, 1054.
6 *Clin. Sci.*, 1951, **10**, 361.
7 *Lancet*, 1951, **2**, 845.
8 *Surgery*, 1949, **26**, 452.
9 *British Medical Journal*, 1938, **2**, 1.
10 *J. Amer. med. Ass.*, 1948, **136**, 659.
11 *Arch. Surg., Chicago*, 1950, **61**, 286.

Spasm has often been invoked as an explanation of the shrinking in an arterial trunk seen below the site of lodgment of an embolus and of the ischaemia which results in the limb distal to it. Kinmonth and Simeone[8] have shown that passive changes in the diameter of large vessels due to variations in blood pressure may cause arterial shrinking that may be mistakenly interpreted as "spasm." Constriction of smaller peripheral vessels due to surgical shock may be similarly misinterpreted.

Whatever the exact nature of the disordered vascular physiology accompanying cerebral vascular accidents, the fact that there is nervous vasomotor control of the cerebral vessels is now established, and sympathectomy may therefore be expected to assist the circulation of blood in them, probably in the same way as it does in the limbs. The physiological basis for periarterial sympathectomy has been questioned in the past, and it is now generally agreed that it is anatomically unsound and without functional effect in the limbs. Improvement reported in the past from the operation can be accounted for by the general vasodilatation which may result from any non-specific operation. The vasomotor nerve distribution to viscera is, however, different from that to the limbs. The sympathetic supply to the hollow abdominal viscera runs with the main arteries and is distributed with their branches, and periarterial sympathectomy is capable in this situation of having a peripheral effect. A similar state exists in the sympathetic nerve supply to the brain, which runs with the carotid and vertebral arteries to be distributed with them to their terminal branches. There is, therefore, a sound anatomical basis for Leriche's attempts to influence brain circulation by section of vertebral nerves and pericarotid sympathectomy.

The results of stellate ganglion blocks for cerebral vascular accidents have also been reported by Mackey and Scott[9] in Britain and by de Takats[10] and Naffziger[11] in the U.S.A. Like Leriche's pioneer work, they are sufficiently favourable to encourage further trial of the technique. If this could be undertaken with objective methods of assessing the changes in vascular and neural function, such as by electroencephalography or estimation of the cerebral blood flow, it would help in judging the clinical improvement brought about by the operation and in studying the underlying physiological changes.

Surgery and physiology owe a debt to Professor Leriche for the way in which he has so often inspired new experiments and the trial of new methods. His article on the cerebral circulation is as stimulating in its thought and vivid in its writing as his many valuable contributions in the past.

PREPARING THE CASE

Some of our correspondents have complained recently about the "delay" in bringing the general practitioners' claim to adjudication. Costs continue to rise, and running their practices becomes an ever more expensive proposition; their plea is therefore understandably for help as soon as possible, and they add to it the fear that their team of negotiators may be unaware of their present needs or lacking in the effort required to meet them. There are several sound reasons which influence the date of the adjudication, and though they were foreseen and have been reported it seems desirable to summarize them here.

The first is that an essential part of the evidence of what remuneration general practitioners actually received from the Government in the year ending March 30, 1950, was made available to the negotiators only last December. As the chairman of the General Medical Services Committee stated at the Annual Conference of Local Medical Committees,[1] it was then known that the Ministry of Health was proposing to use this evidence—though the negotiators do not admit its relevance to the size of the pool—and he added that there were certain implications of it which had to be challenged. It might be thought that these Doctors' Remuneration Tables, as they are called, would be numerical evidence free from any ambiguity. Such is not the case. So diverse and complex are the economics of general practice that minute scrutiny of all evidence of this kind is needed lest unjustified conclusions are drawn from it. The value of this was shown when a similar set of tables, prepared by the Ministry two years ago, was conclusively criticized by the negotiators, and the Ministry had to agree that the figures could not be used. As we pointed out then,[2] "so ineffectual was the method of inquiry that its results were worthless." To ensure that similar errors shall not now be allowed to vitiate the doctors' case, expert opinion has again been brought in to study the new figures in detail.

The second reason for delay is the need to obtain up-to-date figures of doctors' practice expenses and of the earnings of other professional men. It was only a week ago that the Inland Revenue authorities could make available the results of an inquiry into practice expenses for the financial year 1950–1, and again their interpretation needs close study. The latest figures for earnings in other professions have had to be obtained largely from private sources, since many of them are never published, and professional organizations have been generous in meeting the negotiators' requests.

The main reason now why adjudication is not started to-morrow is that a legal case has to be made out. The profession itself wisely insisted on bringing its case before a judge and on its being presented by counsel. One of our correspondents wrote,[3] "One would prefer rather to present the picture of our invidious position with a few bold strokes without nearly so much detail." That may well be so, but the law demands hard facts and figures, for judges do not come to conclusions until they have had all the available evidence. Had it been possible to reach a broad agreement with the Government by means of negotiation there would have been no need for a detailed presentation of the case. The course of events over the last three years has shown only too plainly that such an agreement is impossible, and it is for this reason that the profession first asked for arbitration and finally agreed with the Government to accept the present form of adjudication. The result is that the negotiations are far from the procedure common enough in industry when trade union leaders meet employers' representatives to argue about wages. The procedure of adjudication resembles an action at law rather than bargaining round the table, and the course of it is now largely in the hands of legal advisers.

Nor is it merely a question of briefing counsel with some telling figures to show how doctors have been left behind in the struggle to keep abreast of the inflationary wave. Both general practitioners and the Government have agreed that the Spens Report is to be the yardstick of their remuneration. The relation of what doctors are now receiving to what the Report says they should receive, and to what other professional people receive, is evidence that will be contested in detail at every point by the Government side with all its formidable resources. Having this in mind, Dr. Wand emphasized at the Annual Conference that counsel should be given time to study the brief. He referred also to that imponderable feature of the case which is none the less part of it—namely, the status of the profession. To dwell on this without the facts of expenses and receipts would be fruitless, but as a corollary to them it must be presented. Here again full briefing is required, and, as the Conference agreed, "counsel should know all that lay behind the figures which went to make their case . . . all these cannot be learned by any counsel from a paper brief or from one or two interviews."

Especially to those much in need of relief time has dragged slowly. But the importance the Government attaches to the case is shown by the fact that it is to be represented by the Attorney-General, and a false step now or incomplete briefing on any point would be disastrous. The profession cannot take the risk of hurrying through such heavily mined territory. At every stage the negotiators—all busy men in medical practice—have consulted the profession and have deserved and retained its confidence. The time taken in coming to a conclusion is no grounds for withdrawing it.

[1] *British Medical Journal Supplement*, November 10, 1951, p. 197.
[2] *British Medical Journal*, July 8, 1950, p. 93.
[3] *British Medical Journal Supplement*, January 26, p. 33.

DIAGNOSIS OF DEAFNESS IN CHILDREN

A child unable to hear speech from birth may well hear and respond to sounds louder than speech. With its parents it will also attempt, with varying success, to interpret visually what it cannot hear. Thus it is not always easy to appreciate that a young child is unable to hear speech. Until quite recently it was unusual for a child to be suspected of deafness until it was found at the age of 2, or often later, to be backward in learning to speak. Even then the continued dumbness was often attributed to causes other than deafness, for it was not always realized that if a child is unable to hear speech then it will not learn to speak, since speech is ordinarily acquired by hearing and imitating. At one time it was fashionable to talk about "word deafness" and to regard the inability to hear and speak as being due to some disturbance within the central nervous system rather than to a defect in its listening outpost in the ear. This led to many of the children being treated as psychological or psychiatric problems. Fortunately it is now generally appreciated that the site of the lesion responsible for word or speech deafness in children who have never learnt to speak is almost always the internal ear.

The early recognition of deafness in children, its educational management, and the training of special teachers of the deaf all owe much to the pioneer work of Professor and Mrs. Ewing, of the department of education of the deaf at Manchester University. Thanks to them, parents and teachers are more than ever before alive to the possibility and consequences of a child being born deaf, and, as a result, children suspected of being deaf are now brought to the doctor much sooner than formerly—often before they could learn to speak even with normal hearing. But the doctor's task is still difficult: he faces the problem—and it is a very real problem—of finding out if the child really is deaf and, if so, exactly how deaf it is, particularly in terms of speech. Herein lies the crux of the problem—to measure or to estimate the potential hearing for speech in a child who does not know what speech sounds like.

With most workers in this field the exploration of a young child's sense of hearing is still more of an art than a science, for it entails observation of the child's response, if any, to loud noises, musical sounds, and loud or ordinary speech. By such methods, and with the exercise of great skill and not a little patience, observers with special training can gain an impression of the amount of residual hearing in a young deaf child. It is difficult, however, to express the result of such an examination in a scientific way, as can be done with older children and adults. In them the threshold of hearing for pure tones within the range of speech frequencies is measured with a pure-tone audiometer and the result expressed in chart form on an audiogram. This well-established form of hearing test offers a convenient and accurate picture of the hearing, from which it is possible in many cases of deafness to estimate the hearing for speech. Much of the difficulty in exploring the hearing of young children has been due to the fact that, under the age of 7, a child will not ordinarily give a consistent response to pure tones near its threshold of hearing. Miss M. R. Dix and Mr. C. S. Hallpike[1] in 1947 described their peep-show technique of pure audiometry in which young children were conditioned to respond to pure tones. In this way they were able to plot a pure-tone audiogram for deaf children, often as young as 2. These conditioning tests demand great care on the part of the examiner and, of course, the full co-operation of the child. The latter can best be ensured if the test avoids the use of headphones or other apparatus to be worn by the child, and includes as part of the conditioning procedure a certain degree of pleasurable anticipation. These conditions are provided by the peep-show technique. The child is entirely free to concentrate on hearing the pure-tone sound signal. From previous experience the child knows that only when it hears the sound signal will pressing on a push-button light up the peep-show and enable it to see the pictures.

Dix and Hallpike, in a further paper in this week's *Journal* (p. 235), now give their experiences of this test on 350 children, and they also report on the after-history of many of them in so far as this shows how the educational recommendations based on the audiometric findings have worked out in practice. The procedure of the test has been simplified, and in a single interview of half an hour or less they are able to obtain an accurate picture of the threshold hearing for pure tones within the range of speech frequencies in young children who are hard of hearing and of average intelligence. The resulting audiogram reveals in a graphic and readily appreciable way any potential hearing for speech. This audiogram, combined with a general assessment of the child's intelligence, enables the observer in a short, single interview to offer advice on the education of the deaf child that has proved to be of great assistance to educational authorities, to whom such children have always been a problem. In cases where it can be clearly demonstrated that there is some residual hearing, the nature of the audiogram may encourage the use of a hearing-aid: this may do much to improve the child's speech and may eventually lead to the child being educated with hearing children. Thus, though it is seldom possible to help young deaf children medically, with the information offered by the peep-show audiometer test it is possible to give constructive advice to parents and education authorities on the possible benefit of a hearing-aid and on the most appropriate form of special education.

[1] *British Medical Journal*, 1947, **2**, 719.

ILLEGITIMATE CHILDREN

The position of children to-day is stronger under the law of the land than it has ever been before. But illegitimate children, who represent about 5% of total live births, though sharing in most of the legal and social advances, are still subject to strangely anachronistic disabilities and difficulties. The principal Act is still the Bastardy Laws Amendment Act of 1872,[1] and subsequent amendments have not brought it into line with modern thinking and knowledge. The report[2] of the Joint Committee of the British Medical Association and the Magistrates' Association on the law relating to the illegitimate child (summarized on page 271) rightly urges that the Government should set up a committee of inquiry to investigate the present law and recommend amendments to it. In the present century there have been only two legal enactments which have substantially helped illegitimate children: the Births and Deaths Registration Act of 1947, which provided for the shortened form of birth certificate, and the Legitimacy Act of 1926, which enabled children born before marriage to become legitimate on the subsequent marriage of their parents. But the proviso in the Act that neither parent should have been married to a third party at the time of the child's birth excludes many children from its benefits. The result, as the report points out, is that the children of fornication, but not the children of adultery, can become legitimate. The only course in these cases is for parents to adopt their own child, a procedure which strikes many of them as strange and unnatural.

The law relating to maintenance is in a muddle, to the detriment of the single mother who tries to keep her child. For the 10% of mothers who successfully apply

[1] *Lushington's Law of Affiliation and Bastardy*, 1951, London.
[2] *The Law in Relation to the Illegitimate Child*, 1952. Published by the B.M.A., price 6d.
[3] *The Fortnightly*, June, 1950.
[4] *Illegitimate Children and Their Parents*, 1951. Published by the National Council for the Unmarried Mother and Her Child.
[5] *Legal Position of the Illegitimate Child*, 1939, Geneva.

to the Courts the maximum award is £1 a week, whereas the children's allowance which can be ordered under the Married Women (Maintenance) Act of 1949 is 30s. Moreover, if the father dies owing payments, no claim can be made against his estate, however wealthy he may have been, for past debts or future maintenance. Under the National Assistance Act the unmarried mother has to maintain her child unless there is a court order against the father. But the number of court orders granted each year is only about one-tenth of the number of illegitimate births. Although the figures cannot be directly related, the proportion probably gives a fair picture of the general situation. Very little is known of how the single mother manages, especially when her child grows older. One interesting study, based on case histories obtained by the National Council for the Unmarried Mother and Her Child, was published not long ago by Dr. Agatha Bowley.[3] Local authorities have powers under Section 22 of the National Health Service Act and under Part 111 of the National Assistance Act, but many of them absolve themselves from responsibility by making grants to voluntary organizations to help them carry on schemes which undoubtedly have been helpful in the past but which often have not been considered in relation to to-day's needs.

The social handicaps of illegitimate children are now infinitely less than they were, but lack of means to support the child is still responsible for many unwilling decisions to offer children for adoption. The gap between the infant mortality rates (deaths in the first year of life) of legitimate and illegitimate children continues, though it has narrowed: in 1948 the rates were 33 per thousand live births for legitimate and 45 for illegitimate children, and in 1949 32 and 45 respectively. But, as Lena Jeger[4] has pointed out, the neonatal figures (deaths in the first month of life) are closer: in 1948 they were 19.3 for legitimate and 27.4 for illegitimate children. This may suggest that the troubles come more from rearing a child single-handed than from prenatal or confinement difficulties. But research on this theme is limited by the fact that separate figures are not published by the Registrar-General after the children reach the age of 1, and the literature is scanty. The publication of the present report should call much-needed attention to the difficulties which may beset unmarried parents and their children. In view of the complications which arise from variations in the laws of different countries, the United Nations might well bring up to date the League of Nations' authoritative report on the subject.[5]

INTRAVENOUS PROCAINE FOR PAIN RELIEF

A study of the use of intravenous procaine for the relief of pain has recently been published in the form of a report to the Council on Pharmacy and Chemistry of the American Medical Association.[1] The report—which is the work of Dr. H. K. Beecher, professor of anaesthetics in the Harvard Medical School, and his colleagues—begins by pointing out that "since 1947 almost 50 publications have appeared which report that many varieties of pain, as well as oedema, muscle spasm, itching, symptoms of asthma, and certain eye diseases, have been relieved by intravenous procaine." As these were not controlled trials, the authors have studied the effect of procaine in relieving post-operative pain in 53 patients, comparing the effect of the intravenous infusion of procaine with that of a similar infusion of saline on the one hand and with that of morphine given by intravenous injection on the other. They conclude that procaine certainly has some analgesic action. Saline alone relieved 20% of the patients in the group, while procaine relieved 40%. Morphine, however, relieved 70%. Procaine caused unpleasant symptoms in some patients: thus in one the injection of 75 mg. in four minutes induced generalized clonic convulsions. The commoner symptoms were dizziness, nausea, vomiting, and general numbness. The main conclusion of the report is that intravenous procaine "has no place in the treatment of pain."

It is a little surprising that this report should be necessary, since few doctors would think of giving a continuous intravenous infusion of any drug when several analgesics are available which can be given as a single injection. The report does not deal with the use of procaine for the other conditions mentioned in its first sentence quoted above. Procaine has been shown to have an antihistaminic action,[2] though a weak one, and therefore it may be beneficial in oedema, in the treatment of itching, and in some forms of bronchospasm. Procaine likewise has an effect on skeletal muscle like quinine and therefore will relieve muscle spasm. However, for any of these conditions intravenous infusion is a very inconvenient and troublesome route of administration.

LIBEL AND SLANDER

Collision with the law of defamation is not an occupational hazard for medical men in the way that it is for authors, publishers, the press, and even for lawyers. None the less, even doctors may fall foul of it, and with more and more reports on patients being called for it is as well that the writers of the reports should know what the law of defamation is. In the past it has been principally criticized on the grounds that it restricts full reporting and honest criticism of matters of public interest, exposes authors and their publishers to unfair risks, and encourages gold-digging actions. The weight that such criticism carries is shown by the fact that Parliament made actions for libel and slander share with actions for breach of promise of marriage the invidious distinction of exclusion from the Legal Aid Scheme. It is as if sufferers from a disease regarded by public opinion as slightly disreputable were excluded from treatment under the National Health Service.

The real problem in reform is to hold a fair balance between the right of the individual that his reputation

[1] *J. Amer. med. Ass.*, 1951, **147**, 1761.
[2] Burn, J. H., *British Medical Journal*, 1950, **2**, 691.

[1] Defamation (Amendment) Bill. H.M.S.O., London.

shall be protected and the interest of the public that it shall be properly informed. Parliament has not found it a problem easy of solution, and has indeed made no attempt to deal with it by statute since the last century. It took the Porter Committee nine years to publish its report (in 1948), and it was not until Mr. H. Lever, Labour Member for the Cheetham Division of Manchester, got first place in the recent ballot for private Members' Bills that a Bill[1] largely based on the proposals of the Porter Committee has been introduced.

The most profound proposal in the Bill is concerned with what may be called "unintentional libel." As the law now stands, if reasonable people understand a defamatory statement to refer to the man who complains of it, it does not matter that the author or publisher did not intend to defame or even to refer to him. Few would quarrel with this principle, but it can fairly be considered hard that an author who has had the misfortune to create a disagreeable character who can reasonably be identified with X, of whom he has never heard, should be liable to be mulcted in heavy damages in circumstances in which no blame can be ascribed to him, and in which the cause of the damage to X's reputation is really an unhappy coincidence. The present Bill proposes that in this situation the defendant shall be immune from liability in damages so long as he publishes a correction and apology.

The Bill further deals with the defence of "justification." It has always been a complete answer to an action for defamation that the words complained of are "true in substance and in fact"—rightly so, for it is not the function of the law to protect a reputation which is not deserved. But the defence has been an onerous one to establish, because it is necessary to prove that all that has been complained of is substantially true. If it is written of John Smith that he is a thief and a swindler, the writer's defence will fail if he proves that Smith has been convicted of obtaining money by false pretences but does not prove that he has been convicted of larceny. The proposal to cure this is that, if the words complained of make more than one distinct charge, the defence of justification will succeed if it proves so substantial a part of the charges that those not proved do not add materially to the injury to the plaintiff's reputation: that is, the writer need only prove John Smith's conviction for false pretences provided the jury thinks that a swindler is as bad as a thief.

The Bill proposes to extend and clarify the situation in which newspapers can plead the defence that what they have published is a fair and accurate report of proceedings before the Courts and in other public and "quasi-public" bodies. There is also a proposal to cure some of the anomalies which have arisen from the manful efforts of the Common Law of England—which in theory existed complete from the times of the Angevin kings and is declared only through the mouths of His Majesty's judges in whose bosoms it resides—to cope with the problems posed by the Electronic Age. Sound broadcasts and television are to be treated as libel, not slander, whether they are made impromptu or from a written script.

RIFT VALLEY FEVER IN SOUTH AFRICA

The news, reported by Mundel and Gear,[1] that Rift Valley fever has broken out in South Africa raises many interesting questions both for the medical man and the veterinarian. Rift Valley fever was first described in 1931 by Daubney, Hudson, and Garnham[2] when an outbreak on the shores of Lake Naivasha in the Rift Valley in Kenya attacked sheep, cattle, and man. The infection was found to be due to a virus. Some years previously, in 1912, Montgomery[3] had described from the same area an outbreak of a disease attacking sheep and causing necrosis of the liver: at that time it was not recognized that a virus was the cause.

A mouse protection test carried out on sera from various parts of Africa gave evidence in a survey in 1936 that the virus had almost certainly infected persons living in the Southern Sudan, Uganda, and French Equatorial Africa but not in West Africa.[4] The virus of Rift Valley fever was later duly isolated in Uganda from wild mosquitoes captured in a forest area, but no epizootic or epidemic has ever been known to occur in that country.[5] Now in recent months an epizootic has occurred in South Africa. The first evidence of the disease was obtained from a farm near the Palmietfontein Airport just outside Johannesburg, where a bull died with necrosis of the liver. A virus producing the same lesions in mice as Rift Valley fever was isolated from the tissues of the bull at necropsy and from the blood of three veterinary surgeons and two attendants who suffered from illness after the necropsy.

It was at first considered likely that the infection had been introduced by air, as the airport receives traffic daily from Central Africa, including Kenya. Doubt was thrown on this suggestion when it was found that a widespread epizootic involving sheep and lambs had occurred in the Orange Free State and the Western Transvaal, preceding the death of the Johannesburg bull. Although there is no record of Rift Valley fever ever before having occurred in South Africa, it should be possible to settle the question definitely, for Findlay and Howard[6] have recently shown that immune bodies remain for at least 20 years in the blood of those once infected. The question also arises, What happens to the virus of the fever when it is not, at rare intervals of approximately 20 years, causing epizootics in Africa? A possible clue, which requires following up in larger animals, is the fact that in mice the virus is adsorbed by the larval form of a tapeworm which is normally parasitic in the liver.

We record with regret the death in Colombo on January 23 of Sir Frank Gunesekera, who besides being a well-known general practitioner was also the Deputy President of the Ceylon Senate.

---

1 *S. Afr. med. J.*, 1951, **25**, 797.
2 *J. Path. Bact.*, 1931, **25**, 229.
3 *Rep. Dept. Agric. Kenya for* 1912–13, 1913. Government Printing Office, Nairobi
4 Findlay, G. M., Stefanopoulo, G. J., and MacCallum, F. O., *Bull. Soc. Path. exot.*, 1936, **29**, 986.
5 Smithburn, K. C., Haddow, A. J., and Gillett, J. D., *Brit. J. exp. Path.*, 1948, **29**, 107.
6 *Arch. Virusforsch.*, 1951, **4**, 411.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

THE PROS AND CONS OF IMMUNIZATION—II

BY

ROBERT CRUICKSHANK, M.D., F.R.C.P., D.P.H.

Professor of Bacteriology, St. Mary's Hospital Medical School, London, W.2

In the previous article I discussed the principles of artificial immunization, and, despite the attendant risks, it was thought that, whenever immunization was safe, practicable, and effective, prevention was preferable to cure. In this paper the procedures and indications for inducing active or passive immunity in individual infections are discussed.

Diphtheria

Protection against diphtheria may be produced by passive or active immunization or by a combination of the two methods. Passive immunization used to be practised frequently when a case of diphtheria occurred in a family and it was necessary to protect the other susceptible children as quickly as possible. Nowadays, when most children are actively immunized in infancy, passive protection is rarely needed. When the need does occur in a family or residential nursery or school, all contact children are given an intramuscular injection of 500 units of refined diphtheria antitoxin contained in 0.5 ml. or less, while active immunization of children up to the age of 7 years is begun immediately, or after two weeks when the temporary protection from the antitoxin has been largely lost. Any contact children over 7–8 years who have not been immunized within the past two years should be Schick tested 12 hours or so before receiving the antitoxin. If they are Schick-positive and give a history of previous immunization they should be given one dose of a suitable prophylactic, or two doses at a month's interval if there is no such history. If a child gives a pseudo-positive response (an erythematous reaction with the control material as well as with the Schick toxin) he should not be injected with any diphtheria prophylactic, as he may react severely to it; instead, he should be retested after three to six months.

Active immunization is best carried out in infancy, preferably around 6 months of age, when antibody derived from the mother will have disappeared and the child is less likely to suffer from psychological trauma as some older children do when given repeated injections. Probably the best diphtheria prophylactic for use in this country is P.T.A.P. (purified toxoid aluminium phosphate precipitated), which has a uniformly good antigenic potency and produces the minimum of local reaction. It is not yet, however, generally available as a free issue, whereas A.P.T. (alum-precipitated toxoid), another very good prophylactic, is. Two doses of these prophylactics should be given into the deep subcutaneous tissue in amounts of 0.3 ml. of A.P.T. or 0.5 ml. of P.T.A.P., with an interval of not less than four weeks between the two injections. This interval may be extended to six months or more. The resulting immunity lasts for two to four years in most children, and if this primary immunizing course has been given in the first year of life a further injection should be given about the age of 5 years, when the child goes to school, or earlier if convenient. For this booster dose one of the less powerful prophylactics like T.A.F. (toxoid-antitoxin floccules), 0.5 ml., may be used. Some authorities recommend a second booster dose towards the end of school life, but this is not essential unless the individual is likely to be going to a country where diphtheria is still uncontrolled.

It is most desirable that a high proportion, around 70–80%, of pre-school- and school-children be protected against diphtheria if this infection is to be effectively controlled. Many parents know the disease only by name and may require a good deal of persuasion to have their children immunized against what is to them a rather hypothetical danger. The family doctor must therefore be prepared with good reasons to persuade the doubters of the value and safety of immunization against diphtheria. Even so, we must admit that certain of the more invasive strains of *Corynebacterium diphtheriae*—for example, the gravis and intermedius types—may break through some degree of antitoxic immunity. It is therefore advisable that throat swabs should be taken for bacteriological examination from any patients with exudative tonsillitis or pharyngitis.

Smallpox

Smallpox in its typically virulent form has not occurred as an epidemic disease in this country for many years, although a modified form called alastrim was prevalent in the years between the two great wars. However, localized outbreaks of smallpox occur from time to time and often cause great alarm and much administrative anxiety and expense before the public can be assured that the danger is past. The main worries about such sporadic outbreaks are that the primary case, arriving perhaps by air from the Middle or Far East, may be so mild and atypical as to be missed, that the disease can be highly infectious in the early stages, and that only a small proportion of our population have any degree of immunity against the infection. The tragic deaths from smallpox in recent years of student nurses and others who had never been vaccinated, the upheavals in communities where outbreaks have occurred, and the risks of primary vaccination during school or adult life are part of the arguments that may be used to convince parents of the advisability of having children vaccinated in the first year of life, when severe reactions or complications are very rare.

Vaccine lymph may be obtained from the nearest public health laboratory by sending the appropriate request form, or, if there is urgency, by telephonic request. The potency of the lymph deteriorates quickly if it is kept at room temperature, and therefore the vaccination should be done as soon as possible after the lymph has been received; failing this, the lymph should be stored in a refrigerator and used within two weeks. Primary vaccination may be done at 3–6 months of age, either by scarification or by the multiple pressure technique. In the former method the skin is cleaned with soap or ether and a single linear scratch ¼ in. (0.6 cm.) long is

made on the epidermis with a Hagedorn needle or other suitable instrument through a drop of lymph. In the multiple pressure method the lymph is first spread over an area of about $\frac{1}{8}$ in. (0.3 cm.) square, and with a large flat-sided needle a series of some 20–30 pressures are made on the skin through the lymph (for details, see *Any Questions?** 1951, p. 139). The upper arm or in girls the ankle area are the sites of choice; the thigh should not be used.

Opinions vary about the advisability of covering the vaccination immediately with a dressing; the important point is that the lymph should be allowed to dry before the vaccination site is covered in any way. A dressing may be applied after four to five days, when the vesicles begin to appear, and in the later stages the lesion may be dusted with an antiseptic powder. In older children or adults, in whom the reaction may be more severe, the arm should be rested in a sling. If there is no response the vaccination should be repeated after a week, and it may be repeated a second time if there is still no reaction. Natural immunity in a child of 3–6 months is very rare.

In those who have been vaccinated before, one or other of two reactions different from typical vaccinia may occur. In the "accelerated reaction" vesicles appear early (within two to three days), and the lesion reaches its maximum intensity in four to five days, indicative of some degree of immunity. In the "immune reaction"† a raised itchy reddened lesion, without vesiculation, appears within one to two days, and fades quickly; this reaction, regarded as an allergic phenomenon, may or may not indicate a good degree of immunity. If in doubt the vaccination should be repeated a week later with fresh lymph.

Primary vaccination gives immunity to smallpox for a period of seven to ten years, and ideally every person should be vaccinated in the first year of life and again about the tenth year of life. It is essential that any individual who may run the risk of intimate exposure, such as hospital staff and emigrants to certain countries, should be vaccinated or revaccinated before they are exposed to this risk.

Whooping-cough

Whooping-cough, or pertussis, comes next to measles in its high incidence in the child community. About 40–50% of children have been attacked by the age of 5 years, and about 70% by the age of 10–12. The infection, caused by *Haemophilus pertussis*, is most severe in infancy. Nearly half the deaths occur in the first six months and about two-thirds within the first year of life, but whooping-cough may be serious in any child up to 3 years of age, causing a protracted debilitating infection with the risk of secondary lung complications. If prophylactic vaccination is to be used, therefore, it should be given to children as early as possible, and preferably within the first six months of life. With an effective antigen the antibody response is apparently as good in infants aged 3–6 months as in older infants. Recent experience in America and the results of controlled vaccine trials in this country indicate that a considerable degree of protection can be given to young children by two or three injections of pertussis vaccine.

There may, however, be considerable variation in the protective value of different vaccines, and unfortunately there is as yet no generally accepted animal test by which pertussis vaccines can be assayed. Pharmaceutical firms preparing pertussis vaccine are now well aware of the requirements for the production of good vaccines, and if a doctor is in doubt about the particular brand of vaccine to use he may be able to obtain advice from his medical officer of health. British vaccines are usually prepared in strengths of 10,000 to 20,000 million organisms per ml., and it is customary to give three deep subcutaneous injections of 0.5 ml. at intervals of three to four weeks. Immunization should be begun, if possible, about the second or third month of life, and at present should probably not be offered to children over 3–4 years unless there are special indications. Injections of pertussis vaccine should not be given to a child with a history of convulsions or within three weeks after vaccination. With effective vaccines immunity lasts for at least two years, and a booster dose need only be given if there are special indications for it—for example, a child aged 3 vaccinated in infancy and intimately exposed to the risk of infection.

Combined Diphtheria and Whooping-cough Immunization

It would be an obvious advantage to combine diphtheria and pertussis immunization so as to reduce the number of injections to be given to the infant. Diphtheria toxoid and pertussis vaccine have been combined as one prophylactic and the evidence indicates that the specific antibody response to each of these prophylactics is not thereby impaired. If the pertussis vaccine is known to give good protection the combined prophylactic may be given in three doses, beginning about the sixth month of life. If, however, there is doubt about the protective value of the pertussis vaccine it is wiser not to give combined immunization, since failure of the pertussis vaccine may antagonize parents against immunization in general. There is the further risk of post-inoculation poliomyelitis, which is particularly associated in this country with injections of combined diphtheria and pertussis prophylactic.

Measles

As the virus of measles has not so far been cultivated artificially, there is no method of producing active immunity to this infection by injection of a virus vaccine. Human serum containing antibody to the measles virus may, however, be used either to give complete protection or to modify the attack in a child who has been exposed to the risk of infection. Serum from a convalescent case would be most suitable but is difficult to obtain, since measles is not often seen in young adults who might be asked to donate blood for this purpose. Adult serum, prepared from small pools of donors to reduce the risk of homologous serum jaundice, has been mostly used, but cannot be guaranteed to give complete protection unless injected in very large doses. However, if adult serum is fractionated so as to obtain the antibody-containing globulin (gamma-globulin) in concentrated form, attenuation or complete protection may be obtained with doses of 1–3 ml.

Gamma-globulin is not generally available in this country and the practitioner will usually have to aim at producing a modified attack by giving to the exposed child 10 ml. of adult serum, obtainable from the nearest public health laboratory, as early as possible after

*Obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, price 7s. 6d. (postage 6d.)

†It is suggested that this term be discarded and replaced by "maximum local reaction (non-vesicular) on second/third day."

exposure. When it is remembered that the rash in measles does not appear until the fourth day of the disease, a child who has been in contact with an unsuspected case during the previous two to three days may already be incubating the infection for four to five days before any serum can be given. Attenuation can only be expected if serum is given before the sixth or seventh day of incubation, counting the rash as the fourth day. Modified measles, characterized usually by a discrete or sparse rash without catarrhal symptoms, minimizes the risk of complications, and will give the affected child considerable, but perhaps not complete, protection against subsequent attack.

Whole citrated blood from one of the parents is sometimes used. The blood (10–15 ml.) is drawn into a syringe containing 1–2 ml. of 2.5% sodium citrate, and is immediately injected intramuscularly into the child. Apart from the large amount of blood, which causes an unsightly haematoma, there may be some risk in this procedure of producing rhesus sensitization unless rhesus typing can be done beforehand.

Rubella, Mumps, and Poliomyelitis

Practitioners often ask about the possibility of protecting contacts against these infections by the use of convalescent serum or gamma-globulin. In the case of rubella a woman in the first two to three months of pregnancy who is exposed to attack may, if she develops the infection, give birth to a child with serious congenital defects such as deafness or blindness. The only protective measure that has so far proved effective is the injection of a large dose of gamma-globulin prepared from the serum of convalescent cases of rubella; such material is not likely to be available. Similarly, gamma-globulin prepared from mumps convalescent serum has given some protection against secondary orchitis in young male adults. Convalescent serum gives no protection against poliomyelitis or against paralysis in a case in the pre-paralytic stage.

Tuberculosis

The possibility of using a vaccine of tubercle bacilli to give some protection against tuberculosis to susceptible members of a family or a community exposed to the risk of infection has in recent years become a practical proposition. Killed vaccines were found to be ineffective, but the use of a living attenuated and practically non-virulent bovine strain, called B.C.G. (Calmette–Guérin bacillus) after the French originators, has now become accepted in many countries as a method of protection against tuberculosis. The vaccine may be given, by intradermal injection or scarification, to infants born into a tuberculous family, to susceptible adolescents about the time they leave school, and to medical students and student nurses who may be unduly exposed to the risk of infection.

In the older groups a tuberculin test should first be done to find out whether or not the individual has already latently acquired an infection, and only if the test is negative should B.C.G. vaccine be given. As it is a culture of living organisms the vaccine must be used within 10 days or so of its preparation, and the inoculated individual should be tuberculin tested six to eight weeks after vaccination to find if he or she has now become tuberculin-positive. The positive reactor has ordinarily a greater resistance to tuberculous infection than has the negative reactor. B.C.G. vaccine is at present distributed on request to hospitals and chest clinics where there are specialists in tuberculosis. Any doctor who wishes to use the vaccine should get in touch with the nearest centre where a specialist is likely to be available, or he may apply directly to the Ministry of Health on Form B.C.G. 1.

Enteric Fever

Vaccination against the typhoid-paratyphoid group of fevers is not ordinarily recommended in civilian practice except for nurses going to fever hospitals and for those going abroad to countries where the infection is still prevalent. The vaccine consists of killed cultures of typhoid, paratyphoid A, and paratyphoid B bacilli in the proportion of 1,000 million, 500 million, and 500 million organisms per ml. respectively, and is given in two subcutaneous doses of 0.5 ml. and 1 ml. at an interval of seven to ten days. If the vaccine is "alcohol-treated" to preserve the Vi (or virulence) antigen of Felix the doses should be 0.25 ml. and 0.5 ml. Children under 1 year of age do not need to be vaccinated; the dose for children aged 1–5 years should be about one-third of the adult dose, and for children aged 5–15 years one-half. Immunity, which is by no means absolute, may be expected to last for about two years. Booster doses are given yearly to those likely to be exposed to the risk of infection.

Local or constitutional reactions may occur after an injection of T.A.B. vaccine, which should be given late in the afternoon and the patient advised to go early to bed, taking 5–10 gr. (0.32–0.65 g.) of aspirin if need be.

Scarlet Fever

Scarlet fever is to-day a mild infection distinguishable from streptococcal tonsillitis only by the presence of an erythematous rash. The rash is caused by an exotoxin produced by certain strains of *Streptococcus pyogenes*, and this toxin (which cannot be satisfactorily converted to toxoid) has been used to immunize susceptible individuals against scarlet fever. Because four to six injections of increasing doses of toxin are needed, because local and systemic reactions are not infrequent, and because scarlet fever is so mild and readily amenable to antibiotic therapy, active immunization against this infection is not practised nowadays except perhaps for administrative reasons—for example, among nursing staff in a fever hospital. Passive protection of intimate contacts in a family or institution by an injection of the refined scarlatinal antitoxin has also been mostly discarded.

Influenza and the Common Cold

Epidemics of influenza are caused by viruses which can be cultivated artificially on the chick embryo; there are two main types, called A and B. Vaccines of these two types, given in one injection shortly before exposure, have given a considerable degree of protection against the homologous virus infection. The obstacles to the large-scale use of influenza virus vaccine are the uncertainty of foretelling an epidemic of influenza; the difficulty, when an epidemic occurs, of identifying the infecting strain in time to prepare sufficient vaccine; and the apparently short duration of the artificially induced immunity. Efforts are being made to overcome some of these difficulties, and suitable vaccines may become available, particularly for the protection of those in important posts—for example, nursing staff and medical men—at the onset of an epidemic. As outbreaks usually occur in the early spring, the best time to give the prophylactic vaccine is in November or December.

The common cold is also believed to be due to a virus which, unlike the influenza virus, cannot be cultivated artificially. Therefore at present there is no hope of a common cold virus vaccine. Some individuals, however, seem to suffer unduly from secondary bacterial infections—sinusitis, bronchitis, and the like—after an attack of the common cold, and for these subjects mixed stock or autogenous bacterial vaccines have been recommended in the form of a prophylactic course of injections in the late autumn.

Yellow Fever and Cholera

Vaccination against these tropical infections is required only for travellers to or through certain countries where these diseases are endemic. Inoculations with the living yellow fever virus vaccine are given at certain specified centres named in the list set out in the "Notes to Travellers" issued at the Passport Office and the travel agencies. Certificates of inoculation against smallpox, typhoid, yellow fever, and cholera must be on the prescribed International Form, which the traveller again should obtain from a travel agency or the consulate of the country to which he is going. If his own doctor is unwilling to undertake vaccination or inoculations against typhoid and cholera, the traveller may be directed to one of the centres where these inoculations are being done regularly—for example, in the London area there are inoculation clinics at the Tropical Diseases Hospital, at the Wright-Fleming Institute, St. Mary's Hospital, and at the B.O.A.C. Airways Terminal. In the provinces the doctor can usually find out from the medical officer of health where facilities of this kind are available.

Inoculations against plague and typhus fever are not at present required for travellers abroad.

THE LAW IN RELATION TO THE ILLEGITIMATE CHILD

On February 1 a joint committee* of the British Medical Association and the Magistrates' Association, under the chairmanship of Dr. DORIS ODLUM, issued a report† on the present law governing the custody and maintenance of the illegitimate child. The report has received the unanimous approval of the Council of the British Medical Association, but the Council of the Magistrates' Association, in agreeing to publication, wishes to make it clear that it is not necessarily committed to all the views expressed therein.

After reviewing the legal and historical background of the existing law on bastardy, the committee discusses the rules governing the application to a court for a maintenance order, the limitation of the hearing of such cases to magistrates' courts where the maximum order that can be made is £1 a week, the statutory demand for corroboration of the mother's story, the place of blood tests, the registration of "voluntary agreements," guardianship, adoption, and legitimation, as well as the psychological aspects of illegitimacy and the dangers of poverty in these cases. The committee's recommendations are summarized below.

*The members of the joint committee were:—*For the British Medical Association:* Dr. Doris Odlum (chairman), Dr. F. Bodman, Dr. Denis Carroll, Dr. T. P. Rees, and Dr. J. G. Thwaites. *For the Magistrates' Association:* Mrs. E. G. F. Birley, Major Reginald Bullin, Mr. B. L. Q. Henriques, Dr. W. S. Macdonald, and the Rt. Hon. Lord Merthyr. *Co-opted:* Dr. H. Mannheim, Dr. J. C. W. Methven, and Mr. Claud Mullins.

†The report is obtainable from the Finance and Business Officer, British Medical Association. The price, including postage, is sixpence.

Recommendations

1. The law concerning the maintenance, custody, and welfare of illegitimate children is in urgent need of revision.

2. A committee of inquiry should be set up by the Government to investigate the present law relating to the maintenance, custody, and welfare of illegitimate children with a view to recommending amendments to the law.

3. Under certain conditions a married woman should be enabled to apply for maintenance in respect of an illegitimate child.

4. The High Court should be given concurrent jurisdiction to hear claims for the maintenance and custody of an illegitimate child.

5. When a magistrates' court hears a bastardy case magistrates of each sex should be members of the court.

6. The legal necessity for the corroboration of the applicant's story should be modified.

7. The ruling in the case of Johnson *v.* Pritchard should be modified so that, subject to challenge, all letters between the parties would be admissible in evidence.

8. The maximum amount that can be ordered by a magistrates' court for the maintenance of an illegitimate child should be increased to that applicable in the case of children born in wedlock.

9. Courts should be enabled to extend the duration of bastardy orders beyond the age of 16 in cases where a child is continuing a course of education or training beyond the age of 16.

10. The words "putative father" should not be used in bastardy orders and simple words with the same meaning should be substituted therefor.

11. The usefulness of blood tests and the procedure concerning the use in paternity cases should be further investigated.

12. Further investigation is desirable into the procedure to be adopted by the courts when a defendant alleges that the mother of an illegitimate child has been promiscuous.

13. It should be possible for a voluntary agreement to maintain an illegitimate child to be registered with a court and thereafter to be enforced or modified as if it were an order of a court.

14. In exceptional cases a court should be able to grant an application made by the father for the custody of an illegitimate child.

15. There should be a provision in the law declaring that Section 4 (2) (*a*) of the Guardianship of Infants Act, 1925, as amended by the Children Act, 1948, is applicable to illegitimate children.

16. There should be further investigation into the necessity for the provision in the Legitimation Act which precludes the legitimation of a child in a case where one of the parents was married to a third party when the child was born.

17. The present law, whereby proceedings to enforce payment on a bastardy order cannot be taken after the death of the father, should be amended.

18. Marriage should not be regarded as necessarily desirable when the birth of an illegitimate child is probable.

19. Provided there are no good reasons to the contrary, an illegitimate child should remain with the mother.

20. As far as possible, every illegitimate child should be brought up in a home and a family.

21. The emotional needs of children must be considered when arrangements are being made for the adoption of an illegitimate child, or when foster-parents are being chosen.

22. The fact of a child's illegitimacy should either be explained at an age prior to adolescence, when the child can understand the implication, or earlier in response to questions from the child. The child should not be told of its illegitimate birth during adolescence unless the case has first been referred for expert advice.

23. A new name for the illegitimate child is desirable.

Nova et Vetera

THE NOTTINGHAM GENERAL HOSPITAL

A History of the General Hospital near Nottingham. By Frank H. Jacob, M.D., F.R.C.P. (Pp. 353; 52 plates. £1 5s.) Bristol: John Wright and Sons. 1951.

In July, 1948, most of the former voluntary hospitals in this country came under State control. Since that date there have appeared several histories of individual hospitals under the old regime—obituaries which, while recognizing the inevitability of change, to a certain extent breathe the spirit of the "dear departed." Dr. F. H. Jacob, who himself served the hospital so faithfully for so long, has written much more than a history of the Nottingham General Hospital, for he has striven successfully "to tell something of the lives of the more notable of the vast throng of people who devoted such loving care" to the hospital's welfare. He has done more than this. He has thrown his own personality into the book by inserting a numerous series of comments, relevant and irrelevant, humorous and serious, which delight and surprise though they occasionally tantalize the reader.

The style of the book is leisurely, and there are many quaint allusions which almost remind one of Robert Burton. Here is the start of Chapter 17: "In Elizabethan days the physician, Dr. Gilbert, gave to science the foundation of electricity. In 1895, Röntgen, aged 50, returned the debt of [sic] giving *x* rays to the aid of medicine. 'Chance favours only the mind that is prepared.'—Pasteur." The reader will be interested to note that the new *x*-ray department was placed under the charge of the honorary dentist, and that the first photograph of a stone in the kidney was taken in 1900 with an exposure of 20 minutes.

The author's firm opinion is everywhere expressed. In speaking of the laboratory, he asks the question, "Should a big hospital include scientific research in the work of its laboratory? Yes! It is a positive duty!" The account of the early days of the hospital throws a flood of light upon the life of those times. The wards were opened in 1782, and as early as 1785 were begun the annual feasts to celebrate the hospital's anniversary of its birth. In that year "a sumptuous entertainment was provided," and the company had to drink over a dozen toasts to various people and bodies. The menu for the feast of 1814 is given, and includes two kinds of soup, three varieties of fish, 18 different dishes of meat and game, and eleven sweets. The author comments: "It is almost unnecessary to add that the afternoon was spent in a very cheerful manner."

There are pen pictures of many famous doctors and laymen, among whom one may mention Francis Sibson, W. H. Ransom, W. B. Ransom, Lord Trent, and Sir Charles Seely. One anecdote of Lord Trent remains fixed in one's mind: the old man was crippled and had to be carried everywhere, his limbs were all bent and fixed, he could not move his neck, but he was intelligent and would talk with great rapidity and conduct his business efficiently. If any visitor sympathized with him he gave orders that "that person must never come here again, you know, when they are sorry for me I begin to be sorry for myself."

There is a good account of Sibson's work at Nottingham which contains many new facts about that famous physician's early days. We noted here the only inaccuracy which we found in the book—Sibson was appointed to the staff of St. Mary's Hospital in 1851, not 1861. It is noteworthy that the author has drawn on the obituaries in the *British Medical Journal* for at least 12 of his miniature biographies.

There are many curious facts in this book. We learn that in the early days of the hospital each inmate, whether patient or staff, was allowed 2½ pints of beer each day, and that the hospital brewed its own beer. In those days there were no resident night-nurses, but "watchers" were brought in from outside to keep watch during the night and were paid 6d. each night. But the best of the old customs which will undoubtedly appeal to many moderns, whether medical or lay, is the respect which was shown to the house-visitors. The regulation for 1783 runs as follows: "The Hospital is to be visited by the House-Visitors once every day for the week after their appointment, when they are to walk through the wards with white wands, that they may be known to be House-Visitors; and at noon as they enter the wards, the nurses are to withdraw, and the patients to stand by the sides of their respective beds."

Yes, those were the days!

V. ZACHARY COPE.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Paying for the Health Service

SIR,—The most common of all misunderstandings about the National Health Service is the belief that it is paid for by the Insurance Fund. While this persists it will be difficult to persuade many thousands of patients to be economical in their use of the Service.

It is saddening to find this fallacy repeated in an article in your issue of January 19 (p. 129) from a medical statistician. She actually refers to "National Health stamps." There have been none since 1948. When I last had occasion to give the figures they showed that out of £486m. spent in a year on the National Health Service only £40m. came as grant from the Insurance Fund, and of course the whole of the well-known £400m. (the "ceiling") from general taxation.—I am, etc.,

House of Commons, S.W.1. HILARY A. MARQUAND.

Ovarian Dysmenorrhoea

SIR,—I find it difficult to resist criticizing the article by the late Mr. D. C. Wiseman and Mr. W. M. Thomas on the surgical treatment of ovarian dysmenorrhoea (January 19, p. 141). We have only imperfect knowledge of the cause of menstrual pain, but we presume that pain felt before the period is due either to an abnormal blood congestion of the whole pelvic organs or to a normal congestion in a sensitive woman. Their criterion of diagnosis is pain caused by compression of the ovaries during bimanual examination which "accurately" reproduces their peculiar type of dysmenorrhoea.

Most women suffer painful sensation if their ovaries are squeezed enough, but what woman can identify "accurately" the nature of the pain? The same pain can be produced in these patients if the uterus also is compressed. How much discomfort is caused depends on the time in the cycle at which the examination is made. If just before menstruation, most women will feel discomfort, which will be absent just after the period. But the authors do not state at what phase their patients were examined.

In assessing the "cure" rate (only 49%) patients are included as soon as six weeks and up to three years. What was the percentage of "cures" during the third year? To estimate a "cure" six weeks after the operation is ludicrous, for whatever treatment is given will render the first period painless. The assessment is based solely on the disappearance of a subjective symptom which cannot be measured.

In any case, the majority of the 54 patients (77%) below the age of 30 might be expected to lose their pain after 30 with no treatment at all. There is no mention of whether these 70 women had received other simpler and more orthodox treatment before submitting to an operation which seriously interferes with the ovarian blood supply, inasmuch as the ovarian arteries are divided.

The removal of 27% of normal appendices is irrelevant, because if the appendix has no disease it cannot easily contribute to pre-menstrual pain. Incidentally, quite a number of young

women date their dysmenorrhoea from appendicectomy or a pelvic operation. For example, a young woman from whom I dissected a large dermoid ovarian cyst two years ago has had intractable dysmenorrhoea ever since.

Cotte's pelvic sympathectomy has a rightful place in the treatment of certain cases of severe dysmenorrhoea when other treatment has repeatedly failed, but by this operation there is no interference with the pelvic blood supply.

I can also understand that removal of large dilated veins from a pampiniform varicocele may relieve congestive pre-menstrual pain, but why divide the ovarian arteries when pelvic sympathectomy would be a surer way of denervation?

Some of us believe that interference with the main blood supply of the ovaries causes serious ovarian disability. I notice that only 16% of the married women became pregnant after the operation. It would be useful to know the previous parity of those who conceived.

The authors also recommend a division of the infundibulopelvic ligament, with all that it contains, if an operation for removal of the appendix finds that it "does not show definite signs of acute inflammation." Dysmenorrhoea is a subjective symptom which is usually inherent in the woman's background, personality, and her early training. This is especially true of pre-menstrual pain.

Almost any treatment is successful for a short time, and occasionally permanently. I suggest that if these 70 women had had nothing more than simple opening and closing of the abdomen the "cure" rate would have been the same. Fortunately the operation recommended by the authors is bad enough to ensure that no gynaecologist who has clinical insight and experience is likely to perform it.—I am, etc.,

London, W 1 ALECK BOURNE.

Sexual Disorders in Women

SIR,—In Dr. Joan Malleson's valuable and interesting paper (December 22, 1951, p. 1480) and in subsequent correspondence I have found no reference to the subject of cervical sensation. In performing vaginal examinations I have observed frequently that the patient lies still and relaxed so long as the cervix is not touched, but the instant the finger comes into contact with the antero-inferior surface the respirations deepen and quicken and the patient is obviously sometimes deeply disturbed. So often has this been my experience that I have come to regard the vaginal wall as being normally relatively insensitive, and have concluded that during intercourse the essential factor in obtaining satisfactory orgasm is the impact of the glans penis upon the antero-inferior surface of the cervix.

Hence failure of the woman to obtain an orgasm may be due to two very common factors, malposition of the cervix, such as occurs in uterine retroversion and prolapse, and the use of contraceptive appliances which prevent the tip of the penis from making contact with the cervix.—I am, etc.,

Winfrith, Dorset. P. R. BOUCHER.

Music While You Operate

SIR,—The idea of "Music While you Work" (*Journal*, January 12, p. 102) for the benefit of patients under local analgesia was anticipated by some 20 years by my esteemed friend Mr. R. H. Paramore. When operating with local or spinal analgesia at the hospital of St. Cross, Paramore would have the gramophone and later the wireless playing in the theatre to allay the patient's anxiety. He claims great success for this method.—I am, etc.,

Rugby. W. J. BOLD.

Anaesthetic Explosions

SIR,—It is the fashion to-day to blame static electricity as the cause of anaesthetic explosions, and even to examine the anaesthetist's shoes for charges of electricity. Not so recently, explosions occurred under open ether when diathermy or the electric cautery was used in operations on the nose and throat, with invariably fatal results. Our more recent explosions appear to be due to the more abundant use of *pure oxygen*, in anaesthesia, in oxygen tents, and to overcome the anoxaemia caused by temporary respiratory paralysers.

The manufacturers of pure oxygen are aware that escaping oxygen coming into contact with grease will cause an explosion, and accordingly advise that grease must not be used at the junction of the oxygen cylinder with the anaesthetic apparatus. It is reasonable, therefore, to assume that grease on the patient's face or at the junction of the mask with the patient's face will be liable to cause an explosion, perhaps just as readily.

I went into this matter some 20 years ago with Professor F. G. Donnan, of University College, London, asking him to analyse the gas in an oxygen cylinder because a long flame had shot out from the cylinder junction of a dentist's anaesthetic machine and completely wrecked the glass spittoon some three feet away. Professor Donnan pointed out the fact that pure oxygen plus grease will cause the type of explosion I described.

If we are to cut down the number of deaths from explosion caused annually wherever pure oxygen is directly applied, the answer would seem to lie in supplying the oxygen already diluted with a suitable proportion of nitrogen. The manufacturers could no doubt co-operate in this matter. We require the highest proportion of oxygen in a nitrogen–oxygen mixture which will not fire readily when forced against greasy materials. (I suggest the use of nitrogen, because this gas is already being supplied to occupy the empty spaces in the self-sealing petrol tanks of aircraft.) If the manufacturers supply us with 1/5 oxygen to 4/5 nitrogen, we shall be perfectly safe from oxygen explosions, but already have our natural source of supply. Cylinders will probably have to contain between 60 to 80% oxygen mixed with air to combine safety with usefulness.—I am, etc.,

Slough. N. C. HYPHER.

Night Pain with Fractures

SIR,—The diagnosis of minor fractures at times can be difficult, and to those of us who have no *x*-ray facilities to hand an accurate clinical diagnosis is all the more important. Dr. J. B. Marshall (January 19, p. 163) brings to light an observation of very practical significance. This symptom of night pain I have found, when the question of fracture is being considered, can be applied to a fairly wide field in the realm of minor injuries and can often give a clue in the right direction.

A minor crush injury of the foot, such as is caused by a heavy object falling on the dorsum of the foot, which produces a limping patient with a foot swollen, bruised, tender, and fairly immobile, may leave one in doubt of the presence of a fracture. In this type of case the question can often be settled fairly conclusively from the history of night pain. A disturbed night is almost always indicative of fracture.

In the last year I have seen seven such cases. Four gave a clear history of night pain, and a radiograph showed the presence of fracture or fractures of the small bones of the foot. Those in which there was no night pain gave normal *x*-ray appearances.

In August, 1951, I attended a boy of 10 years who had slipped off the kerb and injured his left ankle. Seen the following day, he complained of little pain and had no signs of fracture. The ankle appeared sound apart from tenderness on dorsiflexion of the foot and tenderness over the medial malleolus. The previous night's rest had been considerably disturbed by pain. *X*-ray examination demonstrated a linear fracture of the lower end of the tibia.

A case of fractured clavicle in a boy of 8 years was encountered in December, 1951—presenting a picture similar to the cases described by Dr. Marshall. The *x*-ray examination was carried out on the strength of the history of night pain.

From the experience of these cases briefly described and of several others encountered, I feel that this symptom of night pain is worthy of consideration. As to the method of its production, might it not be due to relaxation of

muscle spasm when the patient drops off to sleep, producing involuntary movement at the fracture site—a mechanism similar to that which produces "starting pains" in joint tuberculosis ?—I am, etc.,

Arrochar, Dunbartonshire. J. MACKINTOSH.

SIR,—Dr. J. B. Marshall's observation in his letter (January 19, p. 163) is a true one, but is by no means confined to children with this fracture. Patients of any age with a painful condition in the shoulder region have more pain at night, presumably because most of us like to sleep on the side and to change our position in bed frequently. It follows that any patient with a painful shoulder, be it broken or frozen, is much better treated erect and ambulant; while at night sleep is least disturbed in a sitting position with plenty of pillows. Although this position is comfortable, it may not be always tolerable in the average English bedroom in winter.—I am, etc.,

London, S.E.1. M. PICKERING PICK.

Traumatic Autografting

SIR,—For some time it has been recognized that wounds caused by high-velocity projectiles can, on impact, turn the firmer tissues of the body into secondary missiles. It is, however, rarely that these secondary missiles, when embedded elsewhere in the body, survive as living tissues. Usually they are either absorbed or encapsulated as foreign bodies. Recorded cases of traumatic autografts are not common, although a few cases of traumatic homografts of doubtful accuracy can be found in the literature. The case recorded below is of a soldier, aged 25, who was wounded during the Normandy landings by a land mine.

The extent of his injuries was the traumatic amputation of his right leg above the ankle, a wound on the right side of his chin, and two smaller wounds in the shoulder. He was admitted to a casualty clearing station, where a fresh amputation was performed and the facial wound was dressed. He was then evacuated, via a maxillo-facial unit, back to the U.K., arriving approximately 48 hours after his injury. It was then possible to assess more carefully the full nature of his injuries, and the following report was made.

The amputation stump was found to be quite healthy, although there was a tendency to haematoma formation. The face was inspected, and a large jagged bursting type of wound was found on the right side of the chin (Fig. 1). It did not involve the buccal cavity, and the alveolar margin was in continuity. The wound itself was very soiled with vegetation, and was found to contain a mass of fibro-tendinous material. A tendon, running across the wound, firmly embedded and alive, was the subject of much speculation, and it had apparently been blown out from beneath the jaw on the left side. Small portions of the mandible had also been broken off from its lower margin. The dead tissues were cut away and loose pieces of bone removed. No foreign bodies were found. A radiograph at this stage had shown a considerable number of bone fragments overlying the mandible.

A week later he was transferred to a maxillo-facial unit, where Sir Harold Gillies operated 13 days after wounding. Under thiopentone and cyclopropane anaesthesia the whole wound edge was carefully excised and a deep pocket found in the right cheek, level with the angle of the mouth. In this pocket there were portions of a toe or toes complete with tendons, skin, bone, and joints. One of the tendons (extensor hallucis longus) had been previously seen lying over the symphysis menti and had been thought to be a tendon displaced from the neck, possibly the digastric. There was no bony damage to the mandible, but the periosteum was stripped off. The whole wound was very quiescent and only necrotic where a portion of the toe was presenting in the wound and looking like (and previously taken for) a sloughing portion of the cheek. Just below and behind the symphysis menti there was a brass screw, which was presumably from the mine. All foreign tissue was removed.

The patient was evacuated to a general hospital 17 days after the operation, by which time the facial wound had completely healed (Fig. 2).

FIG. 1.

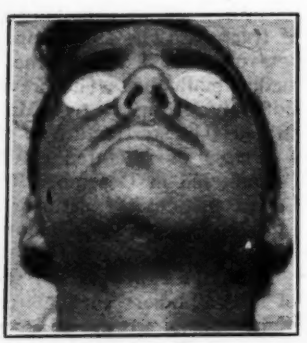


FIG. 2.

It was considered at the time that this case was a remarkable example of the efficacy of penicillin, in that a previously unsterilized toe could successfully survive as an autograft.

I wish to thank Sir Harold Gillies for permission to record this case.

—I am, etc.,

London, W.C.2. J. M. ROBERTS.

Cough Fracture in Late Pregnancy

SIR,—With reference to Dr. J. W. Paulley's letter (January 19, p. 162), a few years ago a patient of mine fractured the eleventh rib (left side) about midway between the tubercle and the tip while coughing during advanced pregnancy. The pain was immediate, and the fracture was confirmed by radiograph. She had old healed tuberculosis of the left lung. Radiography at that time showed much calcification and contraction of the upper zone.—I am, etc.,

Birmingham. W. M. CHESNEY.

Shortage of X-ray Films

SIR,—Perhaps I may comment on the letters by Drs. R. Montgomery and W. A. Bellamy (December 29, 1951, p. 1584) complaining of waste of *x*-ray films in the Medical Research Council trial of antibiotics in pneumonia, reported in the *Journal* of December 8, 1951 (p. 1361). The trial was planned well before the present shortage of films became apparent and in fact was completed before the shortage became at all acute. Once such a trial has begun it is essential to keep to the original protocols. I think we would all agree that in most cases of pneumonia it is unnecessary to take *x*-rays so frequently, and in many cases it is unnecessary to have a film on admission, but surely there is a great deal of difference between the requirements of ordinary clinical practice and those of planned research In clinical research one must obtain as much information as possible and make it as precise as possible.

On a purely clinical level I would disagree with Dr. Bellamy's suggestion that physical examination is all that is required before pronouncing a patient recovered from his pneumonia. The final *x*-ray, after physical signs have disappeared, is the only one which I regard as quite essential in a straightforward case of pneumonia. Over and over again this film will reveal abnormalities which have not been suspected on clinical grounds. Over and over again I have patients referred to me with chronic respiratory disease which might have been prevented if the trouble had been recognized by an *x*-ray taken at the stage when the clinical manifestations of the pneumonia had apparently subsided.

I should point out that these are my personal views and do not necessarily represent those of my colleagues on the Medical Research Council Subcommittee on Pneumonia.—I am, etc.,

Edinburgh, 9. JOHN CROFTON.

SIR,—I was most interested in your remarks (January 12, p. 94) about wasteful tomographic procedures. I have frequently noticed that full-size 12 in. by 15 in. tomograms are being taken, where a film area of 6 in. by 7 in. would have

been quite sufficient to cover the area in question. In order to confirm or exclude cavitation in a certain area it is difficult to reduce the cuts, but surely economies in width and height are possible without detriment to accuracy. A very simple device of covering three parts of a large film with a radio-opaque plate, and centering the beam on the affected area only, makes it possible to tomograph four cuts on one film, and this has the added advantage that four successive cuts can be inspected next to each other at one viewing-box.—I am, etc.,

Wolverhampton. E. POSNER.

Dead or Alive?

SIR,—In an article on "Suicide, Accident, or Murder?" (September 15, 1951, p. 661) Dr. Keith Simpson states, "Stethoscopic examination for the heart sounds is the only really reliable test [of death]: if there is no heart beat for four or five minutes eventual survival is impossible." At the end of the same paragraph he says, ". . . striking recoveries have ensued after long periods of apparently suspended animation in cases of electrocution."

Presumably a long period means more than four or five minutes, and apparently suspended animation includes no discernible heart beat, so I feel he has contradicted himself. I should be glad to know if any of your readers have personal experience of cases of apparent death from electric shock where the heart beats were indiscernible by the stethoscope under good hearing conditions for more than five minutes and yet the patient recovered. Two such cases are reported by Professor Jellinek in his book, *Dying, Apparent Death, and Resuscitation*, but I have been unable to obtain any direct evidence of other cases after writing to a number of authorities in different countries. On the available evidence, however, it does seem unwise to certify a man dead following electric shock, after failure to hear heart sounds for five minutes.—I am, etc.,

Wellington, C.1. T. O. GARLAND.

Tablet Test for Urinary Chloride

SIR,—The valuable paper by Dr. W. H. Taylor (November 10, 1951, p. 1125) on the fallacies of the Fantus test may discourage clinicians from relying upon this estimation, which, in the case of many small hospitals, may be the only guide available. However, if the clinician bears in mind the errors likely to occur, it is surely better to carry on using the test than to have none at all.

As an attempt to minimize the technical errors, the reagents may be combined together in tablet form, thus dispensing with pipetting of the silver nitrate solution. I have found a convenient formula for the tablets to be as follows: potassium chromate 10 mg.: silver nitrate 1.46 mg.: excipient to 1 gr. (65 mg.). The test is performed in a small thick glass test-tube on 10 drops of urine plus approximately 10 drops of water. Tablets are added and crushed with a glass rod until the pink-brown end-point is reached. Each tablet is equivalent to 1 g./litre urinary chloride. The test appears to be quite as accurate as the conventional method and is well received by the nursing staff, for there is less pipetting, with a consequent decrease, for example, in pipette breakage rate.

A report of a detailed investigation into the technical aspects of this test will be published elsewhere.—I am, etc.,

Preston. E. B. LOVE.

Fantus Estimation of Urinary Chloride

SIR,—May I comment upon the criticisms made by Dr. H. L. Marriott (November 24, 1951, p. 1284) of my paper (November 10, 1951, p. 1125)? My purpose was simply to record some of the errors that may arise from the commencement of a Fantus estimation to the giving of treatment on the basis of its result. It would be most unfortunate if this work were in any way to be interpreted as detracting from the valuable contributions of Dr. Marriott in this field.

Dr. Marriott believes the Fantus estimation to be more accurate than my experiments show it to be. He quotes, in his support, work of which no experimental details appear to be available. It is difficult, therefore, to make any comment except to reiterate that the estimation has been found to be inaccurate to the extent indicated in my paper when performed on urine specimens passed up to four hours previously. There is little likelihood of these results being caused by contaminated solutions or by dirty test-tubes, as Dr. Marriott suggested might be the case. As the inaccuracies of the Fantus estimation tend mainly to yield high results, it is not surprising that the actual errors quoted in my table were all on the high side.

My paper also showed that the longer urine stands the more inaccurate is the Fantus estimation likely to be. It was for this reason that my experiments were performed on urine passed within four hours. However, Dr. Marriott (1951) writes:

"The main control observations which should be instituted in every case of potential or actual dehydration and maintained until all danger has passed, are eight-hourly measurements of urine volume and of urinary chloride concentration. . . . When an eight-hourly check is in progress all specimens passed during the period should be mixed. . . ."

While not disagreeing with this advice, it is clear that if urine is allowed to stand for eight hours it is likely to cause errors in the Fantus estimation at least as great as those occurring within four hours. Furthermore, it appears from Dr. Marriott's letter that the unpublished work to which he refers in support of his views was performed "with freshly passed urine"—in other words there is some doubt, from the data available, whether he has in fact checked the accuracy of the Fantus estimation under the circumstances in which he recommends its use.

Dr. Marriott makes the further point that the errors to which the Fantus estimation is subject do not affect its usefulness provided one accepts his limit of abnormally low urinary chloride concentration as 3 g. NaCl/litre. Whatever numerical limit is accepted, though, if an estimation is sufficiently inaccurate to push the value above this limit when it should be below it, a wrong conclusion may be drawn and perhaps because of it a patient given the wrong treatment.

Dr. Marriott also considers that the speed with which the Fantus test can be performed justifies its use. Even if it can be performed in two minutes the highly accurate and trustworthy Volhard estimation can be completed within 10. Are there ever circumstances in hospital practice where this maximal difference of eight minutes could justify the use of a potentially misleading estimation at the expense of one more trustworthy? The Volhard estimation can be quite easily carried out in the side-ward. It needs but two solutions, distilled water, a conical flask, and a 5-ml. graduated pipette, and it estimates only halides however long the urine has been standing or whatever other anions are present.

Turning next to the usefulness of urinary chloride estimations, Dr. Marriott has somewhat misinterpreted my views. After my arguing that to be useful urinary chloride estimations should reflect the body's need of sodium ions there occurs in my paper the following sentence:

"In most patients in whom problems of fluid balance arise in hospital this relationship between urinary chloride concentration and the body's requirement of sodium ions still holds good, but exceptions arise."

I then go on to add further to Dr. Marriott's own list of exceptions. Somehow, however, Dr. Marriott has inferred that urinary chloride estimations are "undesirable," and, having launched this argument, has devoted a whole column of your *Journal* to destroying it. In fact, it will be found that Dr. Marriott's views and my own are not so very far apart. He writes of the usefulness of urinary chloride concentrations that "better definition of limitations will come as knowledge grows." Surely he will admit that my addition of two further instances to his own list of limitations is contributing to this growth. The contributions of Mr. Wilkinson and his colleagues and of Dr. Spencer, which I quoted, also make for "better definition" and do not deserve to be dismissed by Dr. Marriott as "a few disparaging references." Recently Denton (1951) has described further limitation of the usefulness of urinary chloride estimations.

I am sorry that Dr. Marriott should have found my article to contain only "negative criticism" which "is not difficult" and to give "no positive help at all to the inexpert." It was not, of course, my purpose to present an account of salt and water

therapy. He fails, however, to note my recommending the use of the Volhard estimation in preference to that of Fantus, and ignores my concluding statement, "Never to rely upon a urinary chloride estimation alone as a basis for salt therapy but to take into account also the clinical signs and the plasma chloride (or, better, sodium) concentration."

It is possible also that those readers who use the Fantus estimation would welcome the knowledge that the test is less likely to be accurate when using infected urine or urine which has stood for some time. Perhaps, too, the description of further groups of patients in whom urinary chloride analyses afford no reliable guide to salt therapy may be of some positive help to clinicians who face these problems.

In conclusion it is possible that the divergent views of Dr. Marriott and myself may be attributed to the fact that we have worked upon dissimilar groups of patients. My experience has been confined to post-operative patients and to patients unconscious from head injury, cerebral vascular accident, meningitis, or diabetes. From the work of Wilkinson *et al.*, Spencer, and Denton, it would appear that the incidence of circumstances in which urinary chloride estimations fail to reflect the body's sodium requirements is sufficiently high in these patients to call for the modification of schemes of treatment.—I am, etc.,

Oxford. W. H. TAYLOR.

REFERENCES

Denton, D. A., Wynn, V., McDonald, I. R., and Simon, S. (1951). *Acta med. scand.*, Suppl. 261.

Marriott, H. L. (1951). In *Medical Treatment*, ed. Geoffrey Evans, London

Educating the Public about Cancer

SIR,—We in this country should be grateful to Drs. T. A. Watson and O. D. Beresford (January 12, p. 107) for their encouraging letter on this subject. In our experience in the south-west of England the public are eager enough to be enlightened, but opinion in the medical profession is divided. The main objections are that education will depress the spirits of the people by creating a cancer phobia, that if a campaign is inaugurated it will lead to a rush of patients to the doctors' surgeries even when they have nothing the matter, and that the early signs are so varied and dubious that education is impossible. We are confident that if the information given follows sensible lines and not too much is attempted there is a good answer to all these objections. The cancer phobia already exists; if women are assured, as they can be assured, that odd pains in the breast without a lump do *not* mean cancer, and that two-thirds of cases treated early will be alive and well three to five years later and many of them much longer still, their fears will be replaced by astonishment and hope. To the overworked doctor who fears a sudden rush we would say: Which would you prefer, to send 10 women away happy by telling them they have not got cancer, or to have to attend a hopeless case to give morphine every day for six months, because she showed you her breast in July when she ought to have come in January? To meet the third objection, it would be well in the first place to concentrate attention on three well-defined clinical pictures—the painless lump in the breast (which may not be cancer after all), irregular uterine bleeding in a woman past 40, and a sore on the lip, tongue, or in the mouth which does not heal in a fortnight.

In the south-west region records of cancer cases have been collected from all the main hospitals for four or five years past, and a near-hundred per cent follow-up has been maintained. Our records show that, of women knowing they have a lump in the breast, only 38% come up for treatment within three months, and 32% delay for over a year. Of women with uterine cancer, 34% come up within three months, and 38% delay for a year or more. Doctors may think that published figures of cancer "cures" are too optimistic, only the exceptionally fortunate statistics being put on record. We can assure them that in this area, served by about 30 surgeons and radiotherapists, 69.5% of cases of carcinoma of the breast treated in the first stage are alive and well three years after, and 56% after five years. Very few stage 3 or stage 4 cases survive that length of time. Figures for cancer of the uterus are similar. Death from advanced cancer is often a long and painful business, and we are sure it can be avoided in many patients.

What form might education take? One simple way would be for leaflets advising patients with lumps in the breast, irregular bleeding, or persistent sores in the mouth to consult a doctor. These could be distributed in doctors' surgeries, women's institutes, etc. It might be wise, in view of the difference of opinion in the profession, for a trial to be made in one or two areas in the country to see whether the delay period in seeking advice and the number of cancer deaths could after, say, three years be reduced by a vigorous local campaign of public education, of which the keynote should be not fear but hope.—I am, etc.,

Bristol. A. RENDLE SHORT.

Congenital Defects in Mongols

SIR,—The paper by Dr. Martin Bodian and his colleagues (January 12, p. 77) on congenital duodenal obstruction and mongolism was of great interest. I recently surveyed the congenital defects occurring in a consecutive series of 45 mongols who came to necropsy in this hospital in the period 1938 to 1951. The chief findings, which I quote by kind permission of Dr. H. S. Baar, were as follows:

Cardiac abnormalities (excluding patency of the foramen ovale and patency of ductus arteriosus) in 28.

Congenital duodenal obstructions in six.

Harelip and hydronephrosis in two each.

Meckel's diverticulum, partial absence of pancreas, horseshoe kidney, meningomyelocele, congenital hydrocephalus, syndactyly, congenital dislocation of hip, absence of radius, in one each.

The findings in the six cases of mongolism with duodenal obstruction are briefly given in the Table.

Sex	Age at Death	Early Symptoms	Necropsy Findings
F	8 weeks	Vomiting aet. 10 days	Partial stenosis at junction of 2nd and 3rd part duodenum. Peritoneal bands narrowing 3rd part. Small patency of foramen ovale
F	6 days	Vomited blood aet. 2 days	Suprapapillary duodenal atresia. Patency of pars membranacea of patent interventricular septum
M	8 ,,	Vomiting from birth	Suprapapillary duodenal atresia. Subacute pancreatitis Small patency of foramen ovale
M	9 ,,	Vomiting from birth	Complete atresia of 3rd part of duodenum Perforated gastric ulcers with peritonitis
M	6 weeks	Projectile vomiting in 3rd week of life	Partial suprapapillary stenosis of 2nd part of duodenum, 1 cm in length
F	16 days	Vomiting from birth	Partial suprapapillary stenosis of 2nd part of duodenum. Gross dilatation of 1st part

During the same period 15 infants with intrinsic obstructions or atresia of the duodenum (excluding those with malrotations or mesenteric abnormalities alone) were admitted to hospital. The high proportion of mongols—6 out of 15—fully bears out Dr. Bodian's contention.—I am, etc.,

The Children's Hospital, Birmingham. L. M. ROSE.

Diabetic Gangrene

SIR,—The instructive paper by Dr. A. Grunberg, Mr. H. L. Davies, and Dr. J. L. Blair (November 24, 1951, p. 1254) invites brief comment. Nowadays many of these cases need never resort even to "conservative" surgery if large doses of alpha tocopherol are given them. Our first observations on this subject have recently been substantiated by Butturini,[1] and others, of course, have testified to its value in diabetic arthritis[2-4] and in ordinary arteriosclerotic gangrene.[5]—We are, etc.,

WILFRID E. SHUTE.
EVAN V. SHUTE.

London, Canada.

REFERENCES

1 Butturini, U. G. (1950). *Clin. med.*, **31**, 1.
2 Doumer, E., Merlen, J., and Dubrulle, P. (1949). *Pr. méd.*, **57**, 394.
3 Block, M. T. (1950). *Clin. Med.*, **57**, 112.
4 Ged. Med. Thesis, Sim., Paris, 1951, p. 471.
5 Lindgren, I. (1945). *Nord. Med.*, **28**, 2127.

Rapid Cure of Actinomycosis

SIR,—In view of the usually protracted and unhappy progress of a patient with actinomycosis it seems worth recording the rapid recovery of a boy with actinomycosis of the neck who was treated recently.

The boy, aged 14, was first seen on September 18, 1951, with a history of swelling on the left side of the neck of four weeks' duration. It had been steadily increasing in size, but was relatively painless except when he moved his head sharply or when the swelling was touched. Examination showed an area of infiltration on the left side of the neck extending from the anterior border of the sterno-mastoid to the midline and from the mandible to the sternum. He was admitted to hospital as a case of actinomycosis on September 20, and treatment started with "aureomycin" capsules (two six-hourly), potassium iodide 10 gr. (0.6 g.) thrice daily, and penicillin 1,000,000 units daily. Seven days later the area of infiltration was much less, with definite fluctuation in the centre and pus obviously approaching the skin. Incision released pus with typical "sulphur granules." Bacteriological examination revealed *Streptomyces actinomycosis*. On October 22 the incision had healed, and there was no evidence of thickening. All medication was stopped and the patient was discharged.

He has been followed up at the out-patient clinic since, and was last examined on December 23, 1951, when there was no evidence of recrudescence. Progress was rapid after incision of the fluctuating area, and medication might have been stopped earlier. Knowing so little about the dosage necessary for this condition, however, it was decided to continue treatment until no residual thickening could be found.—I am, etc.,

Mauchline, Ayrshire. A. H. SANGSTER.

Westergren and Wintrobe Methods Compared

SIR,—I was much interested in the article by Dr. David Gilmour and Mr. A. J. Sykes (December 22, 1951, p. 1496) on the subject of the relative merits of the Westergren and Wintrobe methods of estimating the sedimentation rate. I find myself substantially in agreement with them.

I did a great deal of work on the subject on behalf of a committee of the Empire Rheumatism Council, the results being embodied in several publications, notably in Fletcher's *Medical Disorders of the Locomotor System* (Edinburgh, 1947). The main conclusion was that the Westergren method was easily the best for the purpose. While it is a little hard to see how the errors described by your writers arise, there can be no doubt that, where rates are increased, the longer the tube is the better. In the short tubes the onset of packing at the bottom of the tube occurs earlier, with the result that lower values are obtained. Where rates are normal, however, the column length seems to be immaterial so long as it exceeds 25 mm., the results being the same in tubes of all lengths (and, incidentally, in all bores also so long as the tubes are kept strictly vertical, small bores being more sensitive to this).

The great virtue of the Wintrobe tube was supposed to be that it lent itself to ready estimation of the cell volume by centrifuging the tube. This was done either before the test was set up, the cell volume being corrected by withdrawing plasma, or after sedimentation had occurred, the results being corrected for cell volume by means of a table. It is hard to see how such correction can be justified even on theoretical grounds when the mechanism of the test is considered. The test depends upon the size of rouleaux of cells falling through plasma of relatively constant viscosity, and a shortage of cells might be expected to produce smaller slower-falling rouleaux rather than the contrary. In actual practice, we have always found that all the evidence pointed to the conclusion that correction for cell volume was wrong. Thus we have had two cases of aplastic anaemia, one very severe (untransfusable on account of reactions): in both these cases the sedimentation rate has been constantly normal for years. Such a finding accords well with our experience of over 20,000 estimations of sedimentation rate, that correction for cell volume could not be justified.—I am, etc.,

London, W.1. J. W. SHACKLE.

Toxic Chemicals in Agriculture

SIR,—It has been stated that there are no sequelae to poisoning by organic phosphorus compounds used as insecticides. In August, 1951, three people developed symptoms of acute poisoning following exposure to a new substance in this group, *bis*-mono-*iso*propyl aminofluorophosphine oxide. Although these symptoms responded in the usual way to the administration of atropine, two patients developed flaccid paralysis involving all four limbs, which came on slowly in the third week after the acute phase of the illness. The lower limbs were affected first and most severely and have not yet recovered fully. The cases will be described in detail in a report which is being prepared for publication. The purpose of this letter is to draw attention to the fact that paralysis resembling that which follows poisoning by tri-*ortho*-cresyl phosphate may also occur after poisoning by other organic phosphorus compounds. Petry (*Zbl. Arbeitsmed.*, 1951, **1**, 86) records a case of similar paralysis in a man exposed repeatedly to parathion in the fumigation of greenhouses.—We are, etc.,

P. LESLEY BIDSTRUP.
London, E.1. DONALD HUNTER.

POINTS FROM LETTERS

Incontinence in Women

Dr. B. E. W. STALLARD (Hereford) writes: Dr. S. Brennan (January 12, p. 110) asks for cases of incontinence in women. Some years ago an unmarried lady about 50 consulted me for dribbling of urine, over one week. On examination the vagina was closed by a thick soft hymen, with a tiny opening about the mid-point, from which urine was trickling. There had never been any injury. I dissected off two-thirds of the hymen and put in a few stitches and she had no further trouble after a slight *B. coli* cystitis cleared. The condition was clearly congenital.

Homes for Incurable Children

Dr. IAN G. WICKES (Stock, Essex) writes: In a letter from the Invalid Children's Aid Association (January 19, p. 161), Dr. A. White Franklin and others emphasize the lack of suitable homes for incurable children with gross physical deformities, and they remark "that, legally, public authorities should provide accommodation for children of this kind, but all too often the bed for the long-term case is just not there." The lack of accommodation for the mentally defective child is also serious and the cause of very great hardship in countless homes, where the whole family is penalized and humiliated by the constant care and attention which a severe mental defective requires. The waiting-list for institutional treatment is several years long, and very little is done to help the weary mother in the interim. From time to time I have taken such a child into a children's ward to give the mother a rest, but experience has taught me to limit the proposed period of admission to a predetermined number of days or weeks. . . . Surely the time has come for an inquiry on a national scale into the demand for and supply of institutional accommodation for mentally and physically incurable children.

Incontinentia Pigmenti

Dr. W. L. CALNAN (Wroughton, Wilts) writes: I have read the interesting article on this subject by Dr. A. White Franklin (January 12, p. 75). The statement that no case has yet been recorded in England is not quite correct. Dr. Henry Haber published a case in 1948. Also I published a report of a child with congenital hemiatrophy in the *Journal* of July 9, 1949 (p. 56), and I described associated cutaneous abnormalities, which I now know to be characteristic of incontinentia pigmenti. I am grateful to Dr. Haber for drawing my attention to the correct diagnosis (*Journal*, July 23, 1949, p. 230). This child, like Dr. White Franklin's patient, was born and lives in Hertfordshire.

Dr. H. HABER (London, N.W.6) writes: In his paper (January 12, p. 75) Dr. A. W. Franklin, reviewing the literature, stated that "no case has yet been recorded in England." May I draw Dr. Franklin's attention to the fact that I showed the first case of incontinentia pigmenti to the Dermatological Section of the Royal Society of Medicine on April 15, 1948 (*Proc. roy. Soc. Med.*, 41, 759)?

Obituary

Sir ARTHUR GASKELL, K.C.B., O.B.E., F.R.C.S.
(Surgeon Vice-Admiral, ret.)

Surgeon Vice-Admiral Sir Arthur Gaskell, Honorary Surgeon to the King and Medical Director-General of the Royal Navy from 1927 to 1931, died on January 12 at Fareham, aged 80.

Arthur Gaskell was born at Dartmouth and studied medicine at University College Hospital, where he qualified in 1892. A year later he entered the Royal Navy as a surgeon. Several years of service at the Royal Naval Hospital at Chatham gave him opportunity to develop his surgical skill, and he became a Fellow of the Royal College of Surgeons in 1899. In 1900 he had charge of the surgical section of the advanced base hospital at Leu-Kung-Tao in the Boxer rebellion. His good work there was recognized by his special promotion to staff surgeon in 1902. Four years later he became fleet surgeon. He took a special interest in physical training and in the teaching of first aid, and while at the Cape station he had a booklet on first aid printed and distributed at his own expense. Some years later at the request of the Admiralty he wrote a primer on first aid which became the official textbook on this subject in the Royal Navy. In 1913 he took the D.P.H., a year before his appointment as first director of medical studies and professor of hygiene at the new naval medical school organized at the Royal Naval College, Greenwich. At the outbreak of war in 1914 he was responsible for the fitting out of the hospital ship *Soudan*, and a month later he became the principal medical officer of the Royal Naval Division and was in charge of the medical unit in the Gallipoli campaign, being mentioned in dispatches and appointed C.B. From 1916 to 1919 he was in charge of the Royal Naval Hospital at the Cape of Good Hope and was awarded the O.B.E. for his valuable services there.

At the end of the war Gaskell was promoted to surgeon-captain, and he served again at the Royal Naval Hospital, Chatham, until 1923, when he was appointed medical officer in charge of the Royal Naval Hospital, Plymouth, and promoted to the rank of surgeon rear-admiral. Three years later he was promoted to surgeon vice-admiral and succeeded Sir Joseph Chambers as Medical Director-General of the Navy, a post which he held until his retirement in 1931. Gaskell was appointed Honorary Surgeon to the King in 1928 and created K.C.B. two years later. After his retirement he served on the Committee on the Medical Branches of the Fighting Services under the chairmanship of Sir Warren Fisher.

Sir Arthur Gaskell is survived by his widow and a son and a daughter. His elder son was killed in action in 1944.

HAZEL H. CHODAK-GREGORY, M.D., F.R.C.P.

Mrs H. H. Chodak-Gregory (née Cuthbert), children's physician at the Royal Free Hospital from 1927 to 1946, died in London on January 12 at the age of 66. Hazel Howard Cuthbert studied medicine at the London School of Medicine for Women, where she was quickly recognized as an outstanding student. She graduated M.B., B.S. in 1911 and two years later proceeded M.D. In 1915 she obtained the M.R.C.P. After qualifying she held various resident appointments, including that of resident medical and surgical officer at the Children's Hospital, Birmingham. She had always a great love of children and knew from the first that her main interest was in their medical care. She took a wide view of this, realizing that it involved a knowledge of social and preventive medicine as well as clinical skill and experience. In 1916 she was appointed acting assistant physician to the Royal Free Hospital. Three years later this appointment was confirmed and she became assistant physician, being the first woman physician to be appointed to the honorary staff. In 1927, when the children's work was separated from general medicine and the Riddell wards for children were opened, she became children's physician to the hospital, a post which she held until her retirement in 1946. She was also for many years physician to the Children's Hospital, Shadwell. In 1935 she became the second woman to be elected a Fellow of the Royal College of Physicians.

Dr. Gregory was always interested in the teaching of students (by whom she was affectionately known as "Mrs. C.-G.") and in their general welfare, and she took her fair share in all the work of the hospital and medical school. She was for some years chairman of the medical committee of the hospital and was vice-dean of the medical school during 1933–8. At the outbreak of the second world war, when the clinical students were posted to the Three Counties Emergency Hospital at Arlesey in Bedfordshire, she was acting dean for the duration. She was resident physician in charge of the division under the E.M.S., with care of children's wards and charge of general medical beds.

Dr. Gregory married towards the end of the first world war and leaves one son, who is in the medical profession.

O. R. and G. B. write: Dr. Gregory was always a stimulating teacher and had the great gift of expecting the best from everyone. At the same time she had a tolerant outlook and a strong sense of values, which enabled her to overlook the shortcomings of others; the few criticisms she made were constructive and never unkind. It was at Arlesey that she became so well known and loved by all with whom she worked. She made an outstanding success of this difficult appointment, integrating the work as a whole and organizing with enthusiasm the social as well as the clinical side of the hospital. She was naturally shy and reserved, and this at times made her appear somewhat unapproachable, but those who came to know her and to be admitted to her friendship realized her great charm, her integrity, and her unselfish readiness to help others. Throughout her life she accepted difficulties with philosophy and courage, especially when she faced so magnificently the losing battle against ill-health.

F. G. writes: The death of Mrs. Chodak-Gregory is a personal loss to many old students and colleagues at the Royal Free Hospital. We came to know her best at Arlesey, where she was senior physician during the war, and to recognize her absolute integrity and sound judgment. Those of us who were residents at Arlesey will always remember the evenings spent with her in friendly and stimulating discussion, and we shall always be grateful for her encouragement and wise counsels.

H. E. SYMES-THOMPSON, M.D., M.R.C.P.

The death of Dr. H. E. Symes-Thompson on January 18 removes from the ranks of medicine one who will long be remembered by his colleagues and friends for his unfailing kindness, geniality, and sympathy for others. He represented the third generation of a family distinguished in the study and practice of disease of the chest. His grandfather, Theophilus, was one of the original

members of the staff of the Brompton Hospital, and was followed by his son in a similar role.

Henry Edmund Symes-Thompson was born in London in 1873. After school at Winchester, he continued his studies at Christ's College, Cambridge, and later at St. George's Hospital. At Cambridge he took the Natural Science Tripos, graduating B.A. in 1894 and M.A. in 1898. He qualified in medicine in 1900, proceeding M.D. in 1903, and becoming M.R.C.P. in the same year. After holding resident appointments at St. George's, the Westminster, and the Brompton hospitals, he was elected in 1905 to the staff of the Royal Northern Hospital, and later to the Royal Chest Hospital, City Road. When he retired from the active staff he became consulting physician to the latter hospital in 1934, having completed 29 years' service with the two hospitals.

He continued for some years in private practice, and among other appointments he was for many years physician to the Royal National Hospital for Consumption, Ventnor. He practised in London through the war years, but his life was saddened by the untimely loss of his eldest son, Edmund, who was killed in an air raid while on duty at his hospital.

Symes-Thompson's personality was an eminently cultured one. His manner was courtly, if diffident. His outlook on life was religious, and for many years he had been examiner to the Society for the Propagation of the Gospel. His approach to medicine was an academic one, and coloured by his expert use of the stethoscope. Radiological diagnosis he regarded at first with some scepticism, but he eventually made full use of the opportunities in diagnosis which it offered. He was proud to relate that the stethoscope was first used in England by Laennec when he demonstrated at the Royal Chest Hospital about 1820. He published a number of papers during his lifetime, including one entitled "The History of Tuberculosis."

Latterly Symes-Thompson spent much of his time at his family residence in Buckinghamshire. He was a keen cricketer and spent many of his leisure hours at Lord's. He is survived by his widow and a son and a daughter, to whom we offer our deepest sympathy.—F. E. S. W.

Dr. JAMES ADAM SMITH died at Huddersfield Royal Infirmary on November 25, 1951, at the age of 27. He studied medicine at St. Andrews University, graduating M.B., Ch.B. in 1947. After qualification he held resident posts in Stirling Royal Infirmary and Huddersfield Royal Infirmary before serving in the R.N.V.R. When he had completed his national service he became house-surgeon (obstetrics and gynaecology) at Blackpool Victoria Hospital, and obtained his D.Obst.R.C.O.G. in 1950. He then entered general practice in Huddersfield, and his untimely death cut short a promising career. Jimmy Smith's passing will be mourned by all with whom he came in contact. Our deepest sympathy is extended to his young widow.—W. S. W.

The death occurred suddenly on December 9, at the Victoria Hospital, Cork, of Lieutenant-Colonel H. E. MURRAY (late I.M.S.), of Castletownshend, Co. Cork, aged 62. A son of the late Mr. Edward James Murray, of Dundrum, Co. Dublin, Herbert Edward Murray was educated at St. Stephen's Green School and Trinity College, Dublin, where he graduated M.B., B.Ch., and B.A.O. in 1913. After a period as house-surgeon at the Royal Victoria Eye and Ear Hospital in Dublin and a trip to Australia as ship surgeon in the liner *Orontes*, he joined the R.A.M.C. in September, 1914. From November of that year until early 1916 he served in the Ypres salient as M.O. to his battalion of the Queen's Westminster Rifles. Transferring to the Indian Medical Service, he had further war experience in the N.W. Frontier Province, and afterwards held various medical military posts in India and Hong Kong until 1925, when he transferred to the civil side of the I.M.S. in Bengal. Returning to Trinity College on study leave he proceeded M.D. in 1929 and M.Ch. in 1930. Thereafter he held a number of important appointments in Calcutta, including those of superintendent of the Presidency General Hospital, professor of midwifery and gynaecology to the Medical College, and first surgeon to the Eden Hospital. He became a Fellow of the Royal College of Obstetricians and Gynaecologists in 1940, and was created a Companion of the Indian Empire in 1944. After retiring from the I.M.S. he held the post of senior obstetrician and gynaecologist at the Leicester General Hospital for a time, but later he went back to India, where he entered into partnership with Lieutenant-Colonel Hamilton in Madras. He returned to Ireland about a year ago, settling in Castletownshend, Co. Cork, where he soon laid the foundations of a good private practice and, in addition, was appointed gynaecologist to the Victoria Hospital, Cork. In 1933 he married Lylie Frances, daughter of the late C. H. Miller, of Co. Dublin. His death at a comparatively early age will be a great loss to the district in which he had so recently settled.

Dr. FREDERICK HUGH SMITH, who practised in Leeds, Lincolnshire, and Lancashire, died on December 18 at Hemel Hempstead. We are indebted to Dr. A. P. Bertwistle for the following appreciation: Dr. F. H. Smith was in my year at Leeds University. He joined up in the 1914–18 war as soon as he could do so in a medical capacity, serving as a surgeon probationer in H.M.S. *Achates*, a destroyer. He was in the thick of the Battle of Jutland. He returned to Leeds to graduate in 1919, and later went to a rubber company in Singapore. He then came back to England to practise for a time in Leeds, but he longed for the country and went to live in Coningsby, in the delightful county of Lincolnshire, where he was thought much of, especially by the poor and aged. He was a magnificent gardener, making a success of those fastidious flowers orchids. He had many hobbies, including playing the violin and philately. He was one of the kindest of men, and had a keen sense of humour. He leaves behind a devoted wife and a married daughter.

Dr. REGINALD NICKLIN died suddenly at Luanshya, Northern Rhodesia, on January 7, aged 47. He graduated M.B., Ch.B. at the University of Birmingham in 1926, and took the M.R.C.S., L.R.C.P. conjoint diploma in the following year. He entered the Colonial Medical Service, and served in Zanzibar from 1929 to 1937, Nyasaland from 1937 to 1947, and Northern Rhodesia from 1947 to 1950, when he retired, having been provincial medical officer, Northern Province. He joined the medical staff of the Roan Antelope Copper Mines, Ltd., in Luanshya during 1950. Dr. Nicklin had all the qualities that go to make an ideal colleague and general practitioner. His unselfishness, kindliness, and good humour never deserted him, and his advice was always wise and balanced. His passing is a great loss. He is survived by his widow and two sons.

Colonel A. O. B. Wroughton writes: I saw with great regret and sorrow the obituary notice of Mr. W. H. MILLER (January 19, p. 167). I first met him in Bedford in 1929 on my retiring from the Army. During my time in Bedford he was a very real friend, and I am deeply grateful for his many kindnesses to me and my wife and family. He was a splendid surgeon and physician and full of sympathy and understanding, and I deem it a privilege to have had him as a friend.

Medico-Legal

DEATH AFTER XYLOCAINE INJECTION

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

The first known example in England of death following an injection of "xylocaine" was the subject of an inquest by the Mid-Northants coroner on December 12, 1951.

The deceased was Miss Monica Annie Atkins, aged 27, of Gayton, Northants. She was known to have suffered from pulmonary tuberculosis since 1946 and had been an in-patient at Creaton Sanatorium since December 15, 1949. A two-stage thoracoplasty had been performed on her on October 9 and November 20, 1951, and parts of seven ribs had been removed to allow the left lung to collapse. She suffered much pain after the second operation and was seen on December 4, 1951, by the senior registrar of the thoracic surgery unit at Oxford, who decided that if certain simple measures failed to alleviate her pain the nerves to the affected area should be injected with a local analgesic.

On December 8, the simple measures having failed, the patient agreed to injection, and at 11.45 a.m. a paravertebral block was begun on the left side with the patient sitting up in bed. A solution of less than 1% xylocaine was used, 10 ml. to anaesthetize the skin and 70 to 80 ml. in all, and no injection was made without first testing to make sure that the needle did not lie in a blood vessel or in the spinal canal. At about 12 o'clock the patient complained of feeling faint, and was told that only one more nerve had to be injected. As she was turned on to her back it was noticed that she was talking irrationally, and 10 seconds later she had a fit, making irregular movements with her limbs. She lost consciousness, and her pulse could no longer be felt. Spontaneous respiration lasted for a few minutes while she was given oxygen and nikethamide injections into the heart and veins, and 0.3 g. of thiopentone was given intravenously to control further fits. After another 10 minutes her heart failed again, and she died at 12.25 p.m.

At necropsy the brain was found to be symmetrical and firm. The leptomeninges and spinal cord were congested. The left lung was collapsed and on section showed tuberculous involvement. There was chronic pleuritic thickening, and on the left side slight paravertebral subpleural haemorrhage. There were old and relatively recent subcutaneous haemorrhagic zones in the left and right axillary regions, especially on the left side, approximating to the areas of the hypodermic puncture marks.

There were no traces of xylocaine or its breakdown products in specimens of cerebrospinal fluid, urine, or blood.

Dr. R. M. Heggie, director of pathology at the Northampton General Hospital, who carried out the necropsy, came to the conclusion that death was caused by intravascular absorption of the xylocaine used in the paravertebral block and its subsequent cerebral medullary action. His inquiries showed that 500–600 thoracoplasties had been performed with xylocaine without accident, and indeed it had previously been used on the patient for her own thoracoplasties without untoward effects. But he said that in a recent paper quoted to him describing 130 successful thoracoplasties there was a warning about the use of xylocaine in areas where deep bruising was suspected. (An annotation on xylocaine appeared in the *Journal* of January 26, p. 211.)

A verdict of death by misadventure was recorded.

According to the *Report on the Work of the Central Midwives Board*, just published, the M.R.C. Committee investigating the use of trichlorethylene in childbirth is still unable to recommend its use by midwives on their own. None of the inhalers submitted for trial has been found satisfactory. Since April, 1950, midwives have been able to give pethidine, although it is on the Dangerous Drugs List, but the regulations are to be changed to impose a limit to the total amount they can hold.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on December 15, 1951, the following degrees were conferred:

D.M.—J. J. Pritchard, B. F.-A. Swynnerton.

B.M.—J. P. Blandy, D. H. Malan, E. T. C. Tewson, D. H. Eaton, P. D. Grant, I. S. L. Loudon, K. F. R. Schiller, J. A. Smith, R. D. Weeks, W. T. Barrett, I. O. Carlisle, W. M. Jordan, C. V. Mann, D. F. Woodhouse, H. B. Calwell, B. T. Bond, M. S. Compton, F. S. Keddie, W. F. C. Kennedy, M. A. Fenton, A. M. Stobie, P. R. Walker, M. W. Sweet-Escott, K. F. M. Thomson, W. Whitechurch, C. F. Bolton, J. M. Davies, Hélène V. Goodman, Jean Ginsburg, G. T. Haysey (in absence).

Dr. H M. Sinclair has been elected a member of the Committee of the Museum of the History of Science until Michaelmas Term, 1954.

J. R. P. White (Queen Anne's School, Caversham) has been elected to a Nuffield Medical Scholarship at Lady Margaret Hall; C. Streatfeild (Ashford School for Girls, Kent) to an H. T. Gerrans Exhibition in Medicine at Somerville College; and C. A. Baker (College Scholar, and Croydon High School, Girls' Public Day School Trust) to a Scholarship in Medicine at St. Hugh's College.

UNIVERSITY OF CAMBRIDGE

Bryan Harold Cabot Matthews, C.B.E., Sc.D., F.R.S., has been elected Professor of Physiology in the University, as from January 1, in succession to Dr. E. D. Adrian, O.M., P.R.S., who is now Master of Trinity College. Professor Matthews was born on June 14, 1906, and was educated at Clifton College and at King's College, Cambridge, of which he has been a Fellow since 1929. He graduated B.A., with first-class honours in physiology, in 1927 and proceeded M.A. four years later. The degree of Sc.D. was conferred upon him in 1937. He held a Beit Memorial Fellowship for medical research from 1928 to 1932, and was assistant director of research in physiology in the University from 1932 to 1947. When the readership in experimental physiology was established in 1947 he was appointed to the post. He was a British member of the 1935 International High Altitude Expedition for Physiological Research. He was director of the R.A.F. Physiological Research Unit in 1940 and director of the R.A.F. Institute of Aviation Medicine from 1944 to 1946. Professor Matthews was elected F.R.S. in 1940 and appointed C.B.E. in 1944.

UNIVERSITY OF ST. ANDREWS

Professor Earl R. Loew, Professor of Physiology in the University of Boston School of Medicine, has been appointed Visiting Lecturer for 1952 in the Faculty of Medicine of St. Andrews University. Professor Loew will hold his lectureship in the Department of Pharmacology and Therapeutics, Medical School, Dundee, for the month of September.

The following candidates have been approved at the examination indicated:

FINAL M.B., CH.B.—D. M. Alexander, R. H. Arnold, J. S. Bain, H. J. Barclay, D. G. P. Brown, Betty K. Dean, H. R. Foreman, Elizabeth H. L. Hay, R. L. Kelly, C. W. Law, Margaret E. J. Leckie, R. A. C. Lundie, D. M. McKerrell, H. A. Maher, R. Moncrieff, G. I. Rooney, Joan E. Warren, Eleanor T. Winter, Ariane G. M. Wiseman.

UNIVERSITY OF GLASGOW

The following degrees were conferred on January 12:

M.D.—[1]A. J. V. Cameron, W. A. Dewar, [2]K. C. Grigor, [3]A. G. Macgregor, [4]F. C. Rodger, [5]T. Young, C.B., O.B.E., K.H.P., Major-General.

CH.M.—[1]D. St. C. L. Henderson, [2]J. Hutchison.

M.B., CH.B.—S. Alexander, I. R. G. Barclay, J. D. Begg, A. W. Bennie, J. W Browning, R. Budge, J. C. Burgess, J. D. Caldicott, Evelyn M. Camrass, Doreen M. Chisholm, A. S. Cooper, L. MacD. Craig, D. Craigen, A. B. B. Culhane, J. Curley, G. M. Currie, E. Diamond, E. D. Docherty, J. N. Docherty, A. L. C. Duncan, T. H. Fairbairn, P. Forrester, W. V. Fowler, J. R. Freeland, R. A. Garden, I. A. Gibson, H. P. Gillespie, W. D. S. Hepburn, J. Houston, R. D. Hunter, Mary G. S. Hyslop, J. Lambie, W. K. Lawson, I. A. Levy, R. H. MacKay, Moira R. Mackie, T. C. G. McKirdy, M. MacLean, W. McLellan, A. G. W. McLeod, A. McQuater, W. I. Martin, R. H. D. Miles, J. Mitchell, G. P. Moffat, L. MacG. Munro, T. H. Neilson, J. M. Paterson, J. Rintoul, W. P. Ritchie, N. MacN. Robertson, C. C.

Robson, C. Rooney, W. R. Sadler, Katherine S. Scott, J. Sengupta, J. Sharp, R. A. Speirs, J. Stevenson, W. H. S. Thomson, Ann M. Wilson.

[1]With honours. [2]With high commendation. [3]With commendation.

UNIVERSITY OF LONDON

The following appointments are announced: Professor W. G. Barnard, a representative of the General Medical Schools on the Senate for the remainder of the period 1948–52 in place of Dr. C. F. Harris; Professor J. M. Mackintosh, delegate of the University at the Health Congress of the Royal Sanitary Institute to be held at Margate from April 22 to 25; and Professor Esther M. Killick, a representative of the Board of Preclinical Studies on the Board of Advanced Medical Studies for 1952.

The following degrees were awarded on January 9:

M.D.—*Branch I (Medicine):* K. D. Allanby (Mark of Distinction and University Medal), D. E. St. J. Burrowes, D. J. Charley, K. M. Citron, H. E. F. Davies, D. C. Deuchar, M. E. Fearnley, P. R. Fleming, R. S. Francis, Joan Frankton, H. J. Goldsmith, Helen C. Grant, P. L. de V. Hart, I. T. Twistington Higgins, K. Hugh-Jones, R. C. King, S. Mason, Margaret R. Miller, H. I. Obeyesekere, W. D. Ratnavale, M. J. Riddell, F. F. D. Rosenthal, O. T. Samani, R. S. Savidge, D. J. Sheehan, K. Simpson, J. D. Stevens, Joyce F. Tucker, P. S. Tweedy. *Branch II (Pathology):* D. M. H. Cogman, J. B. Enticknap, G. A. James, C. R. Knappett, C. H. R. Knowles, I. L. M. Larkin, D. R. Lucas, A. C. F. Ogilvie, N. P. Orchard, R. Pilsworth, L. J. Rubinstein, K. E. Saunders, G. B. D. Scott, B. J. Stephens, O. G. Williams. *Branch III (Psychological Medicine):* L. Ford. *Branch IV (Midwifery and Diseases of Women):* J. C. Holman, S. D Perchard. *Branch V (Hygiene):* A. E. Brown, R. G. Davies, Margaret I. Hendrie, A. C. McLeish. *Branch VI (Tropical Medicine):* R. Buri, H. McD. Forde, K. R. P. Kent.

UNIVERSITY OF WALES

The following candidates at the Welsh National School of Medicine have satisfied the examiners at the examination indicated:

D.P.H.—Alison H. C. Alwyn-Smith, J. C. Burns, T. Sanderson (with distinction).

UNIVERSITY OF BIRMINGHAM

Professor A. C. Frazer has been appointed a member of the Colonial Medical Research Committee, and Dr. Hugh Paul a representative of the University at the Health Congress of the Royal Sanitary Institute to be held at Margate, April 22–25.

The title of Honorary Member of Staff has been conferred on Dr. C. W. Taylor on his relinquishing his Lectureship in Pathology.

Two developments in the clinical course have recently been approved by the Faculty of Medicine, as follows: (1) Senior clinical students will in future be attached to approved general medical practitioners for short periods, and (2) University Clinical Lecturers are to be invited to act as tutors to medical students during the three years of the clinical course.

The Leonard Parsons Memorial Lectureship Appeal Fund has reached approximately £4,750 and a committee has been set up to consider the terms and conditions of the lectureship.

In Congregation on December 14, 1951, the following degrees were conferred:

M.D.—D. G. B. Richards, J. H. Hale (*in absentia*).

Ph.D.—C. R. Lowe, M.D., D.P.H., Vera Norris, M.B., Ch.B.

M.B., CH.B.—H. W. K. Acheson, D. B. Allsop, P. B. Clarke, K. G. Dickinson, C. T. G. Flear, E. R. Ford, Sheena Forsyth, R. J. Genever, Doreen Grimshaw, C. Hodgson, V. A. Lloyd, C. A. B. McLaren, D. Martyn-Johns, S. G. F. Matts, A. T. Smyth, B. G. Spilsbury, J. C. N. Tibbits, O. Troughton.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At the annual meeting of the College, held on December 6, 1951, Dr. W. A. Alexander was elected President, and Professor L. S. P. Davidson and Drs. D. J. Acworth Kerr, D. N. Nicholson, R. M. Murray-Lyon, J. G. M. Hamilton, and Thomas Anderson members of council for the ensuing year. Dr. Acworth Kerr was elected Vice-president of the College.

At a meeting of the council of the College, held on December 11, 1951, the following officers were elected for the ensuing year: *Treasurer*, Dr. J. A. Bruce; *Secretary and Registrar*, Dr. J. Halliday Croom; *Honorary Librarian*, Professor D. Murray Lyon.

FACULTY OF RADIOLOGISTS

The following candidates satisfied the Fellowship Board at the November, 1951, examination for the Fellowship: *Radiodiagnosis*, I. ApThomas, K. E. Barlow, J. C. Bishop, J. L. Boldero, and S. Moor. *Radiotherapy*, W. D. Fraser and J. M. W. Gibson.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending January 12 (No. 2) and corresponding week 1951.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (126 in 1951), London administrative county, the 17 principal towns in Scotland (16 in 1951), the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	33	3	11	0	0	30	5	9	1	5
Dysentery	315	32	80	6		698	65	124	2	1
Encephalitis, acute	3	1	2	0	1	2	0	0	0	
Enteric fever:										
Typhoid	3	0	1	1	3	0	0	1	1	0
Paratyphoid	3	0	1 (B)	1		8	1	2 (B)	0	
Food-poisoning	134	4		0		65	22		1	
Infective enteritis or diarrhoea under 2 years				13	16				7	14
Measles*	2,840	33	311	96	57	18,658	2425	355	89	155
Meningococcal infection	51	4	11	0	2	61	4	29	7	3
Ophthalmia neonatorum	34	8	7	0	2	19	1	9	0	
Pneumonia†	1,056	67	304	1	2	2,538	160	805	75	4
Poliomyelitis, acute:										
Paralytic	33	4	} 4	} 0		{ 27	0	} 2	} 1	} 5
Non-paralytic	3	2				11	1			
Puerperal fever§	247	35	6	3		102	13	9	3	
Scarlet fever	1,055	68	248	32	37	852	70	219	37	57
Tuberculosis:										
Respiratory			114	27				116	33	
Non-respiratory			23	5				17	1	
Whooping-cough	2,394	88	391	84	54	4,980	490	882	61	79

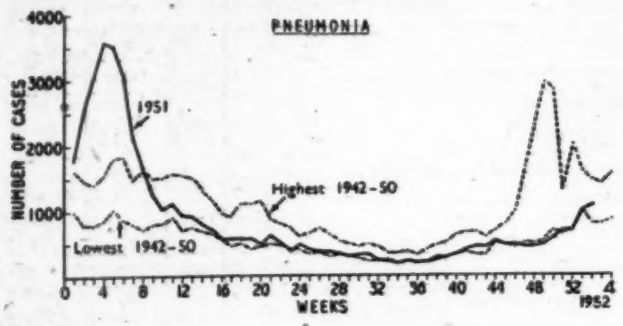
DEATHS‡ in Great Towns	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	1	1		0	0	*0*	0	*0*	1	0
Dysentery	1	0		0			0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0		0		*0*	0	*0*	0	
Infective enteritis or diarrhoea under 2 years	20		0	0	1	*18*		*5*	1	0
Influenza	31	6		1	0	*890*	81	*58*	38	2
Measles		0		0	0		1	*0*	0	0
Meningococcal infection		1					2	*0*		
Pneumonia	350	50		13	15	*982*	125		51	17
Poliomyelitis, acute	3	1			0	*6*	0			0
Scarlet fever		0		0	0		0	*0*	0	0
Tuberculosis:										
Respiratory	} 150	{15	29	3	11	} *256*	{44	*34*	11	11
Non-respiratory		3	2	0	3		2	*2*	0	1
Whooping-cough	3	0		0	1	*15*	3	*6*	0	1
Deaths 0–1 year	326	43	50	11	25	*326*	47	*69*	16	15
Deaths (excluding stillbirths)	6,408	958	779	140	199	*10,328*	1558	*1202*	346	275
LIVE BIRTHS	7,644	1099	975	211	430	*7,109*	1214	*894*	210	384
STILLBIRTHS	218	21	24			*186*	17	*30*		

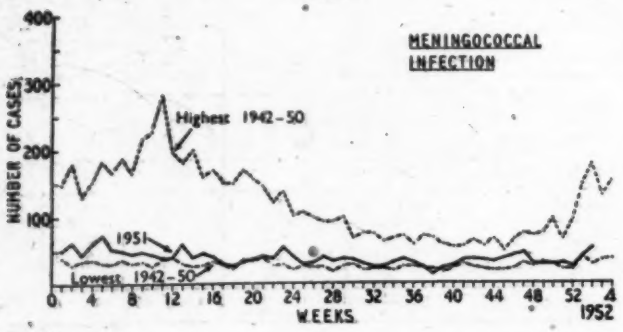
* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.
‡ See "Census Changes" on p. 283.

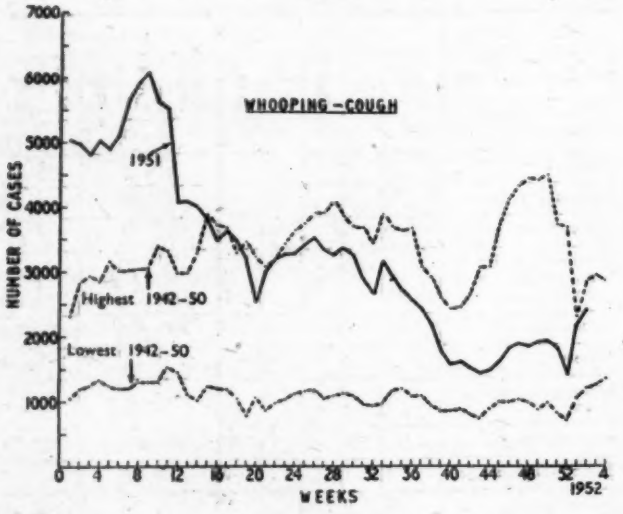
Vital Statistics

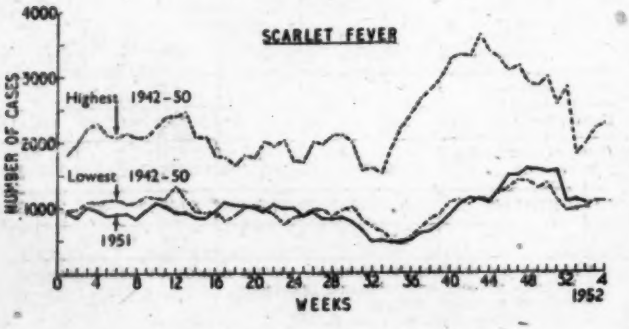
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported during the nine years 1942–50 are shown thus - - - - - - -, the figures for 1951 and 1952 thus ———. Except for the curves showing notifications in 1951 and 1952, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

The chief variations in the number of notifications of infectious diseases in England and Wales during the week ending January 12 were increases for whooping-cough by 240 and acute pneumonia by 83, and decreases for measles by 651 and scarlet fever by 47.

Only small fluctuations occurred in the local returns of scarlet fever. The largest rises in the notifications of whooping-cough were Lancashire 59 and Norfolk 41. The number of notifications of diphtheria were 12 fewer than in the preceding week. The largest decreases in the local trends of diphtheria were falls of 3 in each of the counties of London, Cheshire, and Northumberland. The largest falls in the number of notifications of measles were Warwickshire 182, Kent 124, Durham 74, and Lancashire 52.

The number of notifications of acute poliomyelitis were 15 more for paralytic cases and 4 fewer for non-paralytic cases than in the preceding week. The largest centres of infection were London 6, Yorkshire West Riding 5, Staffordshire 4, and Lancashire 3.

A rise of 20 occurred in the number of notifications of dysentery. The largest return was that for Devonshire 52 (Exeter C.B. 37, Plympton St. Mary R.D. 9). The outbreak in Exeter began in the preceding week with 13 cases. A further 31 cases were notified from the outbreak in Norfolk, Norwich C.B. The outbreak in Norwich has now persisted for eight weeks and 669 cases have been notified. The other large centres of infection during the week were London 32, Lancashire 31, Middlesex 26, Southampton County 25 (Havant and Waterloo U.D. 11), Leicestershire 16, Warwickshire 14.

In Scotland the notifications of dysentery increased by 37, mainly because of an increase of 26 in the established outbreak in Lanark county.

Road Accidents

Casualties on the roads of Great Britain in November, 1951, totalled 19,052. This was 1,034 more than in November, 1950. The killed numbered 563, an increase of 53 on the previous November; and the seriously injured, 4,848, an increase of 468. The chief increases were among pedestrians and pedal cyclists. Pedestrian casualties were 800 higher than in November, 1950, while casualties to pedal cyclists rose by 299 (Ministry of Transport).

Week Ending January 19

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,211, whooping-cough 2,349, diphtheria 22, measles 2,828, acute pneumonia 869, acute poliomyelitis 35, dysentery 434, paratyphoid fever 6, and typhoid fever 4.

Infant Mortality Rate Improves

Provisional figures for England and Wales for the fourth quarter and for the year 1951 show a continued improvement in infant mortality. The birth rate for the year was lower than in 1950, but the stillbirth and death rates were higher.

Live births registered in the fourth quarter numbered 154,212, representing a rate of 14.0 per 1,000 population, compared with rates of 14.5 and 15.3 in the same quarters of 1950 and 1949, respectively. The total of live births registered in the year 1951 was 679,497, representing a rate of 15.5 per 1,000 population as compared with 15.8 in 1950.

The infant mortality rate was 28.3 per 1,000 related live births, compared with 28.3 and 32.3, respectively, in the same quarters of 1950 and 1949. The total for the year 1951 was 20,103, representing a rate of 29.6, the lowest ever recorded in this country. This rate compares with 30.0 in 1950 and 52.8 in 1938.

There were 3,807 stillbirths registered in the quarter, giving a rate of 24.1 per 1,000 total live and still births, compared with rates of 22.7 and 22.6 for the fourth quarters.

of 1950 and 1949, respectively. The rate for 1951 was 22.9, compared with 22.7 in 1950 and 1949.

The deaths registered in the quarter numbered 121,759, representing a rate of 11.0 per 1,000 population, compared with 135,359 and a rate of 12.3 for the corresponding quarter of 1950. The total number for the year 1951 was 548,918, and the rate was 12.5, compared with 11.6 in 1950. The increase was concentrated in the first quarter of the year, during which there was a widespread influenza epidemic.

Census Changes.—Population figures obtained at the 1951 census show that there are now 160 great towns (population over 50,000) in England and Wales instead of 126, and 17 principal towns (population over 30,000) in Scotland instead of 16. Therefore the 1952 figures for deaths, births, and stillbirths in these countries, published weekly in our Table, cannot be accurately compared with those for 1951, which are printed in italics. The 160 great towns in England and Wales have a population about 10% higher than in the 126.

Medical News

Health Service Charges.—The Chancellor of the Exchequer, Mr. R. A. Butler, announced in Parliament on January 29 that a shilling charge on prescriptions is to be introduced. This would bring in £12m. in a full year. There will also be charges for some appliances, such as surgical belts and boots, hearing-aids, and wigs. Amenity beds in hospitals will cost more. Where there is hardship help will be given in meeting the new charges. In the dental service the patient is to pay the cost of treatment up to £1.

Guide to London Social Services.—The London Council of Social Services has recently published a little handbook intended to present a picture of the various organizations offering social services in the London area. The different types of services provided by statutory and local bodies are briefly described, and also the new social services—Family Allowances Act, National Health Services Act, and so on. A history of social services seems rather out of place in so short a pamphlet, and the space it occupies could more profitably have been filled with further useful addresses. As it is, the appendix gives a few, but for the most part tells the reader that they may be found in the telephone directory. However, the *Handbook to the Social Services in London* does summarize in a small space an account of the services available, and, even if addresses have to be looked up, the place to find them is given. It is obtainable from the council at 7, Bayley Street, London, W.C.1, price 7½d. post free.

Artificial-eye Specialists.—An association of artificial-eye specialists has been formed at 15, Woburn Square, W.C.1, to look after the interests of these technical practitioners.

Yugoslav Rehabilitation Team.—A group of doctors and medical auxiliaries from Yugoslavia have been studying rehabilitation in this country and the U.S.A. during the past six months. Plans for their tour were made with the help of W.H.O. The team, consisting of three doctors, a nurse, a social worker, an occupational therapist, a remedial gymnast, and a secretary, was under the leadership of Dr. Zotoeic. On January 21 the Yugoslav Ambassador and Madame Brilej gave a reception on the eve of the team's return to Belgrade, where they will establish a rehabilitation unit which it is hoped will eventually serve as a training centre for workers from Yugoslavia and other countries.

Sir Edward Mellanby Honoured.—The Royal Swedish Order of the North Star (Commander, First Class) has been conferred on Sir Edward Mellanby, formerly secretary of the Medical Research Council, in recognition of his services to medical research in Sweden. The decoration was presented to him by the Swedish Chargé d'Affaires, M. Unger, on January 21 at the Swedish Embassy in London.

What's What in International Medicine.—The Council for the Co-ordination of International Congresses of Medical Sciences issues a quarterly bulletin giving details of the council's aims and achievements, information about many international medical and para-medical organizations, and a valuable calendar of international congresses to be held in 1952 and later. The bulletin will be sent free of charge to universities, medical organizations, etc., from Unesco House, 19, Avenue Kleber, Paris, 16e. Otherwise it costs 2s.

Publication Difficulties of Scientific and Medical Journals.—The *British Medical Journal* is not alone in receiving an unprecedented flood of contributions and in struggling under a heavy burden of printing and paper costs. Many scientific journals are experiencing identical difficulties, and the Royal Society has set up a publications commission, with Professor S. Zuckerman (professor of anatomy, Birmingham University) in the chair, to discuss the whole problem with the Master Printers Federation and the printing trades unions, and to consider whether the Treasury might be asked to make a bigger grant in aid of publications. New and cheaper methods to replace ordinary printing will also be considered. Varitype, for instance, is a way of printing from typescript which avoids all the expense and delay of hand-setting of type by experienced compositors. The Society finds that costs have at least doubled since before the war, that the number of suitable papers submitted for publication in the *Proceedings* is going up by at least 20% annually, and that the publication delay, which used to be a maximum of six months, is now approaching the two years already experienced by some journals. The great increase in papers is attributed to the enormous increase in the numbers of science graduates since 1945, and the flood is expected to grow as more and more complete their first research. It has also become more important professionally to be the author of a list of published papers.

Any Questions?—The first printing of *Any Questions?* has now sold out, and the book is being reprinted. It is hoped to be able, in about six weeks' time, to supply those who have already ordered copies. Those requiring copies, but who have not yet ordered them, are urged to make early application to the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

50 Years' Progress in Medicine.—Over 300 pages of text, a complete index, and 32 illustrations, all for 15s., make *50 Years of Medicine* a valuable book to have. A symposium surveying the progress of medicine and surgery over the first half of the century was published in the *Journal* in 1950, and the articles are now obtainable in book form. Much useful information is contained in the book, which is of interest to medical and lay readers alike. It may be bought from booksellers or direct from the Publishing Manager (post free) at B.M.A. House, Tavistock Square, London, W.C.1.

Emergency Bed Bureau at Liverpool.—This service completed its third year of operation on September 30 last, and its latest annual report shows that in the year it handled over 12,000 applications for admission to hospital. Nearly 500 of these were from hospital out-patient departments, the rest being from general practitioners. 92.8% of the cases were admitted, and beds found for a further 560 patients were refused by them. Teaching hospitals were able to take in 900 cases at the Bureau's request. Admission of elderly patients (60 years old and over) was the most difficult, as was to be expected.

Emergency Bed Service: Applications and Admissions.—During the seven days ending January 28 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 1,165, of whom 85.4% were admitted.

COMING EVENTS

Broussais Hospital Courses.—Three courses will be held in Paris at the Broussais Hospital from May 18 to May 31; the subjects covered will include renal pathology (four days), allergic diseases (six days), and three *journées médicales* will be devoted to papers on a wide range of subjects, such as the treatment of acute leukaemia, allergic migraine, and the use of A.C.T.H. The registration fee is 2,500 francs; the number of participants is limited to 150, and early application is advised. Full details may be obtained from Dr. R. Wolfromm, 96, rue Didot, Paris, 14e.

International Diabetes Federation Congress.—People interested in the congress to be held at Leyden, the Netherlands, during the second week of July, 1952, are requested to apply for a prospectus to Dr. R. D. Lawrence, 149, Harley Street, London, W.1.

Tuberculosis Conference.—The twelfth conference of the International Union against Tuberculosis will be held at Rio de Janeiro, under the presidency of Professor Manoel de Abreu, from August 24 to 27. The subjects for discussion are immunity and tuberculosis, treatment and prognosis in minimal pulmonary tuberculosis, and organization and results in regard to the tuberculosis campaign of mass surveys. Members of the union may take part in the conference without paying an admission fee. Physicians who do not belong to the union may apply for membership of the conference, and should send in their applications exclusively through their Government or national association, who are alone qualified to forward such applications. All requests for information concerning the scientific discussions should be sent to Professor Etienne Bernard, secretary-general, 66, Boulevard St. Michel, Paris. All requests concerning the organization of the congress should be sent to the secretariat of the conference, 197, Avenida Mem de Sa, Rio de Janeiro. Applications from physicians in Great Britain should be sent through the N.A.P.T., Tavistock House North, Tavistock Square, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday

CAMBRIDGE MEDICAL SOCIETY.—At Physiology Lecture Theatre, Addenbrooke's Hospital, Cambridge, February 4, 8.15 p.m., annual general meeting. *"The Use of Antabuse in the Treatment of Alcoholic Delinquents and Criminals,"* film to be shown by Dr. Erik Jacobsen (Copenhagen).

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, 17, Bloomsbury Square, London, W.C.—February 4, 7.30 p.m., *"The Work of the Privy Council,"* by F. J. Fernau.

Tuesday

ANGLO-JEWISH ASSOCIATION.—At 33, Seymour Place, London, W., February 5, 8.30 p.m., *"Jews in Medicine,"* by Dr. W. J. O'Donovan

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., February 5, 5.30 p.m., *"Methods of Research in Social Medicine,"* by Dr. Alice M. Stewart.

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—February 5, 5.30 p.m., *"Sweat,"* by Dr. C. A. Keele.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—February 5, 5 p.m., *"Prevention of Shock and Anaemia in Trauma,"* Arris and Gale Lecture by Mr. A. R. Clarke.

WEST END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck Street, London, W. (entrance for lectures 40, Marylebone Lane, W.).—February 5, 5.30 p.m., *"Intracranial Abscess,"* by Mr. G. C. Knight.

Wednesday

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—February 6, 5.30 p.m., *"Mycology—Histoplasmosis: Coccidioidomycosis,"* by Dr. R. W. Riddell.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., February 6, 4.30 for 5 p.m., *"Treatment of Gonorrhoea,"* by Dr. W. N. Mascall.

MANCHESTER MEDICAL SOCIETY: SECTION OF MEDICINE.—At Physiology Theatre, Medical School, Manchester University, February 6, 4.30 p.m., *"Modern Methods of Treatment of Pulmonary Tuberculosis from the General Practitioner's Angle,"* by Dr. M. J. Greenberg.

OXFORD UNIVERSITY.—At Radcliffe Infirmary (Maternity Department Lecture Theatre), Oxford, February 6, 5 p.m., *"Insulin Tumours of the Pancreas,"* Litchfield Lecture by Professor J. Morley.

Thursday

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., February 7, 5.30 p.m., *"Contributions in the Twentieth Century to the Practice of Health,"* by Professor J. M. Mackintosh.

FACULTY OF HOMOEOPATHY.—At Royal London Homoeopathic Hospital, Great Ormond Street, London, W.C., February 7, 5 p.m., *"Indigestion from a Surgical Standpoint,"* by Mr. Harold Dodd.

HARVEIAN SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—February 7, 8.15 p.m., *"Low Backache,"* discussion to be introduced by Mr. P. H. Newman and Mr. Leslie Williams.

●INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Great Ormond Street, London, W.C.—February 7, 5 p.m., *"Abdominal Surgery in Childhood,"* by Professor Ian Aird.

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—February 7, 5.30 p.m., *"The Reticuloses in Relation to Dermatology,"* by Dr. J. O. Oliver.

LIVERPOOL MEDICAL INSTITUTION.—At Royal Southern Hospital, Caryl Street, Liverpool, February 7, 2.30 p.m., afternoon clinical demonstration.

MANCHESTER MEDICAL SOCIETY: SECTION OF ANAESTHETICS.—At Staff House, Manchester University, February 7, 8.15 p.m., short papers.

●MOTHERS' CLINIC, 108, Whitfield Street, London, W.—February 7, 2.30 p.m., lecture and demonstration (on living models) on Contraceptive Technique by Marie C. Stopes.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—February 7, 5 p.m., *"Surgical Treatment of Banti's Syndrome,"* Hunterian Lecture by Professor A. H. Hunt.

ROYAL INSTITUTION, 21, Albemarle Street, London, W.—February 7, 5.15 p.m., *"Respiratory Pigments,"* by Professor H. Munro Fox, F.R.S.

ST. ANDREWS UNIVERSITY.—At Lecture Theatre, Materia Medica Department, Medical School, Small's Wynd, Dundee, February 7, 5 p.m., *"Recent Work on Blood Groups and their Clinical Significance,"* by Professor D. F. Cappell.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, London, S.W.—February 7, 4.30 p.m., lecture-demonstration in neurology by Dr. D. Williams.

Friday

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—February 8, 5.30 p.m., *"Developmental Abnormalities,"* clinical demonstration by Dr. R. M. B. MacKenna.

●INSTITUTE OF DISEASES OF THE CHEST AND INSTITUTE OF CARDIOLOGY.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., February 8, 5.30 p.m., *"Surgical Aspects of Cyanotic Congenital Heart Disease,"* by Mr. T. Holmes Sellors.

OSLER CLUB.—At Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C., February 8, 7.45 p.m., *"Hippocrates in Ancient and Modern Times,"* by Dr. W. N. Mann; *"On Translating Hippocrates,"* by Mr. John Chadwick; *"Amputations—Hippocrates and Modern Times,"* by Mr. Leon Gillis; *"Hippocrates and Periodicity in Life and Disease,"* by Dr. J. H. D. Webster.

OXFORD UNIVERSITY.—At Magdalen College, Oxford, February 8, 5 p.m., *"The Neurophysiological Basis of Mind,"* Waynflete Lecture by Professor J. C. Eccles, F.R.S.

Saturday

SOUTH-EAST METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY.—At Kettlewell Hospital, Swanley, Kent, February 9, 10.30 for 11 a.m., general meeting. *"The Pulmonary Circulation in Lung Disease,"* lecture by Dr. Paul Forgacs.

APPOINTMENTS

AARON, F. E., M.B., Ch.B., D.C.P., Assistant Pathologist, Stockport and Buxton Group, Manchester Regional Hospital Board.

BROWN, G. LAING, M.D., D.P.H., Consultant Physician-Superintendent, Bucknall Hospital, Stoke-on-Trent.

DALZELL-WARD, A. J., M.R.C.S., L.R.C.P., D.P.H., Deputy Medical Director, Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1.

DONOVAN, WILLIAM, M.B., M.A.O., M.R.C.O.G., Obstetrician-Gynaecologist to the Counties of Sligo, Leitrim, and Donegal, Eire.

HUTTON, JAMES, M.D., D.P.H., Medical Officer of Health, School Medical Officer, and Port Medical Officer of the Borough and County of Poole and Medical Officer of the Poole area of Dorset.

LANDON, JOSEPH JOHN, M.B., B.Chir., Medical Officer for Corporation Staff Welfare, etc., Public Health Department, City of Birmingham.

LUM, L. C., M.B., B.S., M.R.C.P., M.R.A.C.P., Physician-Superintendent (Consultant) at Nayland Sanatorium, East Anglian Regional Hospital Board.

MANCHESTER REGIONAL HOSPITAL BOARD.—*Consultant Ear, Nose and Throat Surgeon, Blackburn Hospitals Centre,* J. Evans, M.D., F.R.C.S.Ed. *Consultant Neuro-Surgeon, Salford Royal and Crumpsall Hospitals,* H. A. Maslowski, M.D., F.R.C.S.Ed.

NORTH-EAST METROPOLITAN REGIONAL HOSPITAL BOARD.—*Part-time Consultant Psychiatrist, St. John's Hospital, Chelmsford,* Winifred M Burbury, M.B., B.S., D.P.M. *Part-time Consultant Psychiatrist, Prince of Wales's Hospital,* J. C. Sawle Thomas, M.R.C.P., D.P.M. *Part-time Consultant Psychiatrist, St. Clement's Hospital,* P. H. Tooley, M.D., M.R.C.P., D.P.M. *Part-time Assistant Psychiatrist (S.H.M.O.), Chelmsford Child Guidance Clinic, and Walthamstow Child Guidance Clinic,* J. E. G. Vincenzi, M.R.C.S., L.R.C.P., D.P.M. *Part-time Assistant Venereologist (S.H.M.O.), Prince of Wales's Hospital,* R. Atlas, M.D. *Part-time Consultant Venereologist, Oldchurch, Chelmsford and Essex, and Tilbury and Riverside (Tilbury Branch) Hospitals,* E. M. C. Dunlop, M.D., M.R.C.P. *Full-time Assistant Anaesthetist (S.H.M.O.), Chase Farm Hospital,* Edith de Winter, M.D., D.A. *Maximum Part-time Consultant Anaesthetist, North Middlesex Hospital,* W. F. O'M. Doherty, M.B., B.Ch., D.A.

O'SULLIVAN, JOHN THOMAS, M.B., D.P.H., Medical Officer, Rathmullan (Co. Donegal) Dispensary District.

SOUTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.—*Whole-time Consultant Chest Physician, Croydon Area,* R. H. J Fanthorpe, M.D., M.R.C.P. *Whole-time Assistant Chest Physician (S.H.M.O. Grade), Kingston and Mortlake Area,* R. Hambridge, M.R.C.S., L.R.C.P. *Part-time Consultant Child Psychiatrist, West Sussex Child Guidance Service,* F. T. Shadforth, L.R.C.P.&S.Ed., D.P.M. *Part-time Consultant Psychiatrist, Belmont Hospital,* F. O'D. Finigan, M.B., B.S., M.R.C.P Ed., D.P.M. *Part-time Consultant Dermatologist, Lambeth and Wandsworth Groups of Hospitals,* M. Fewel, M.B., B.Chir., M.R.C.P. *Part-time Consultant Dermatologist, Farnham Group of Hospitals,* J. Morgan, M.D. *Part-time Consultant Pathologist, Battersea and Putney Group of Hospitals,* R. S. Ralph, M.R.C.S., L.R.C.P., D.P.H. *Part-time Consultant Orthopaedic Surgeon, Epsom Group of Hospitals,* H. H. Kennedy, F.R.C.S.Ed. *Whole-time Assistant Physician and Deputy Physician-Superintendent (S.H.M.O. Grade), Dorking General Hospital,* E. G. Wilkins, M.D., M.R.C.P., D.T.M.&H. *Registrar to Medical Department, South-western Hospital,* Z. J. Prokopowicz, M.B., Ch.B. *Senior Registrar to Surgical Department, Redhill County Hospital,* J. P. Turney, M.B., B.S., F.R.C.S. *Senior Registrar to Anaesthetic Department, St. Helier Hospital,* R. A. Green, M.B., B.Chir., D.A. *Registrar to Group Pathological Laboratory, St. Mary Abbots Hospital,* A. Swan, M.B., B.S. *Senior Registrar to Radiological Department, St. James' Hospital,* A. W. R. Jenkins, M.B., B.Ch., D.M.R.D *Senior Registrar to Pathological Service, Portsmouth and Isle of Wight Groups of Hospitals,* J. A. U. Morgan, M.B., B.S., M.R.C.P. *Senior Registrar to Ophthalmological Department, Southampton Eye Hospital,* G. Bennett, M.B., Ch.B., D.O.M.S. *Registrar to Obstetric and Gynaecological Department, Mayday Hospital,* Mary G. Coyle, M.B., Ch.B.

THOMAS, WILLIAM EDGAR, M.R.C.S., L.R.C.P., Part-time (Temporary) Medical Officer of Health, Ammanford Urban District Council, Carmarthenshire.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Fulton.—On December 24, 1951, at Manygates Maternity Hospital, Wakefield, to Lesley, wife of Dr. John B. Fulton, Alverthorpe Grange, Wakefield, Yorks a son.

Jepson.—On January 16, 1952, at Invercargill, New Zealand, to Joan (formerly Blacklock), wife of Dr. L. Frank Jepson, a son—Charles Robert.

Semple.—On January 21, 1952, at the Middlesex Hospital, London, W., to Dr. Alison Semple, wife of Dr. Robert Semple, a daughter.

MARRIAGES

Masters—Newland.—On January 5, 1952, at St. Mary's Church, Bromley, Kent, Edgar James Masters, M.B., B.S., to Jean Newland.

DEATHS

Battersby.—On January 15, 1952, in hospital, at Taplow, Bucks, John Battersby, M.B., Ch.B., L.D.S., of 17, Regent Street, Nottingham.

Browne.—On January 17, 1952, at The Lindens, Farnborough Park, Hants, Edward George Browne, C.B., C.M.G., L.R.C.P.&S.I. & L.M., D.P.H., Major-General, R.A.M.C., retired, aged 88

Crawford.—On January 22, 1952, at Nuffield House, Guy's Hospital, London, S.E., Hugh Gregan Crawford, O.B.E., M.C., M.R.C.S., L.R.C.P., of Ryland House, Cannock Wood, Rugeley, Staffs.

Edwards.—On January 13, 1952, in hospital, following an accident, Francis Henry Edwards, M.D., M.R.C.P., of "Brightlands," Reigate, Surrey, aged 80.

Heath.—On January 19, 1952, at Otley, Suffolk, James Glover Heath, M.R.C.S., L.R.C.P.

Hort.—On January 25, 1952, at 19, Fitzjohns Avenue, London, N.W., Frederick Aylmer Hort, M.D.

Kelly.—On January 27, 1952, at 329, Roundhay Road, Leeds, Christopher Peter Kelly, L.R.C.P.&S.I. & L.M., aged 90.

Lamb.—On January 24, 1952, Ralph Lamb, M.R.C.S., L.R.C.P., L.D.S., of Low Roof, St. George's Road, Hightown, near Liverpool.

Menon.—On January 15, 1952, at St. Joseph's Hospital, Whalley Range, Manchester, Maniketh Vythi Menon, M.R.C.P.Ed., D.P.H., D.T.M., of 524, Oldham Road, Manchester, Lancs, aged 60.

Milliard.—On January 14, 1952, at the Royal Infirmary, Manchester, Peter McDonald Milliard, L.R.C.P.&S.Ed., L.R.F.P.S., of 191, Slade Lane, Levenshulme, Manchester, Lancs.

Purvis.—On January 19, 1952, in London, John Allen Spottiswoode Purvis, M.B., B.Ch., aged 53.

Renshaw.—On January 13, 1952, Graham Renshaw, M.D., of St. Michael's, Hale, Cheshire, and 30, St. Ann's Street, Manchester, aged 79.

Saunders.—On January 16, 1952, Charles Howard Saunders, M.B., B.Ch., of The Hill, Hedge End, Southampton, aged 84.

Singer.—On January 20, 1952, at 25, Milton Avenue, Sutton, Surrey, Hugh George Singer, M.R.C.S., L.R.C.P., aged 38.

Smith.—On January 19, 1952, at his home, "Thrushleys," Middlestown, near Wakefield, Yorks, Charles Holden Smith, M.B., Ch.B., aged 58.

Stallard.—On January 19, 1952, at his home, Penncot, Morin Road, Paignton, Devon, John Prince Stallard, M.D., formerly of Oxford Road, Manchester, aged 94.

Thomson.—On January 14, 1952, at his home, 10, Southfield Avenue, Barnton, Midlothian, Thomas Lauder Thomson, M.D., D.P.H., aged 74.

Vawdrey.—On January 16, 1952, at West Worthing, Marion Ethel Unwin Vawdrey, L.R.C.P.&S.Ed., L.R.F.P.S., formerly of East Horsley, Surrey.

Any Questions ?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Tuberculous Glands in the Neck

Q.—*Could you tell me the latest views on the treatment of tuberculous glands in the neck? Are streptomycin and para-aminosalicylic acid (P.A.S.) worth trying? Has deep x-ray therapy a place? When should surgical block dissection be advised?*

A.—In tuberculosis, even more than other illnesses, it is important to treat the patient, not the disease. In nearly all cases, tuberculosis of lymph glands is not an isolated lesion but one manifestation of a widespread disease, and the main principle of treatment is to overcome the infection either by general measures or by specific remedies. Streptomycin and P.A.S. are emphatically worth trying. Surgical measures are called for to evacuate pus or to remove avascular caseous material which the drugs cannot reach. There is no place for *x*-ray therapy. A surgical block dissection, which implies removal of glands as part of a block of connective tissues, is not advised. Exceptionally, when the disease appears to be localized to a small group of glands they may be dissected out.

Analgesics for the Nose

Q.—*What analgesics are best for use in the nose before instrumentation? What are the dangers?*

A.—If by instrumentation is meant such manœuvres as the passage of a Eustachian catheter or antrum cannula, the best analgesic is undoubtedly a 5% or 10% aqueous solution of cocaine hydrochloride, applied with a fine spray. This is not only a rapidly acting and effective analgesic, but also a powerful vasoconstrictor. If deeper analgesia is desired the nose may be packed with ribbon gauze or cotton-wool pledgets which have been soaked in a mixture of equal parts of the cocaine solution and 1 in 1,000 adrenaline and then squeezed out.

The chief danger of cocaine is its toxicity, the susceptibility of patients varying considerably. The danger is avoided by using the minimum amount, by avoiding swallowing, and by prior administration of a barbiturate in persons known to be susceptible. A remote risk is the development of cocaine addiction. Because of these dangers, or when cocaine is unobtainable, less toxic substitutes are used, chiefly 2% amethocaine hydrochloride. These are slower acting, and are not vasoconstrictors, so a little ephedrine or adrenaline solution should be added to them.

Further information may be found in *Diseases of the Nose, Throat, and Ear,* by Jackson and Coates (Saunders, Philadelphia, 1929), and in the most recent edition of *Diseases of the Nose and Throat,* by Thomson and Negus (Cassell, London, 1948).

The Egg and the Sperm

Q.—*How long can (a) the ovum and (b) spermatozoa survive in the human female genital tract? How reliable are the answers to this question?*

A.—(*a*) There is no exact information available on the time during which the ovum remains capable of being fertilized. Hartman (1939), however, considers that all the experimental data on higher vertebrates, including monkeys, indicate that the unfertilized ovum survives for only a few hours; these data are so concordant that they may be accepted as applying to women also.

(*b*) The viability of spermatozoa in the healthy vagina is very limited, and live spermatozoa are seldom found eight

hours or more after intercourse. Their viability in the cervical canal depends upon the stage of the menstrual cycle: the cervical mucus in the early part of the cycle is scanty and "hostile" so that sperm penetration is poor and viability is usually confined to a few hours; in the immediately pre-ovular phase, the mucus is normally copious and easily penetrated by spermatozoa which survive for long periods; very shortly after ovulation, cervical hostility reappears and the survival time drops to a few hours. In general, it may be taken that spermatozoa will survive for 12 to 24 hours in receptive mucus, but there are reports of much longer survival times—e.g., Cary (1936) found spermatozoa present 80 hours after intercourse.

The reports on viability within the uterus and tubes are very variable: Joël (1942) found viable spermatozoa within the uterus at 25 hours, but in the tubes all were dead within 20 hours of coitus; Hünner (1929) found living spermatozoa in the uterus seven days after coitus; Dührssen (1893) claimed to have found them in sealed tubes three and a half weeks after the last occasion of intercourse; and Nürnberger (1920) states that he found them in normal tubes removed 13 and 14 days after the last occasion of intercourse. It must not, however, be concluded that spermatozoa surviving for such long periods would still necessarily be capable of fertilizing ova. On the contrary, all the reliable data indicate that coitus preceding ovulation by more than 24 hours, or succeeding it by more than a very few hours, is most unlikely to result in fertilization and conception.

REFERENCES

Cary, W. H. (1936). *J. Amer. med. Ass.*, **106**, 2221.
Dührssen, A. (1893). *Z. Geburtsh. Gynäk.*, **27**, 216.
Hartman, C. G. (1939). *Sex and Internal Secretions*, 2nd ed., Williams and Wilkins, Baltimore.
Hünner, M. (1929). *Disorders of the Sexual Function in the Male and Female*. F. A. Davis Co., Philadelphia.
Joël, C. A. (1942). *Schweiz. med. Wschr.*, **72**, 440.
Nürnberger, L. (1920). *Mschr. Geburtsh. Gynäk.*, **53**, 87.

Schools for the Educationally Subnormal

Q.—*What provision is made under the National Health Service (or elsewhere) for the free or assisted schooling of mentally handicapped children? To whom must application be made for assistance?*

A.—The Education Act of 1944 imposes upon local education authorities (i.e., county and county borough councils) the duty of securing educational provision "for pupils who suffer from any disability of mind or body, by providing, either in special schools or otherwise, special educational treatment—that is to say, education by special methods appropriate for persons suffering from that disability."

The following extract from the latest report of the Ministry of Education is relevant (Cmd. 8244, 1951, H.M.S.O.):

"The new approach to the problems of special educational treatment and ascertainment introduced by the 1944 Act was specially important in connexion with the treatment of the educationally subnormal, the term now used to describe both those children who, before 1945, had been certified as educable mental defectives and those who had been classified as merely dull and backward. The category of educationally subnormal extends over a wide range of mental ability from the child who only needs some special help in the ordinary school to the lower limit of those who can gain benefit from education in a special school. The emphasis has thus shifted from certifying a child as 'mentally defective' (a term now confined to children who are ineducable at school) to discovering what is best for the child of subnormal ability and trying to provide this for him. For the majority the task is within the compass of the ordinary schools; nevertheless, a considerable proportion need to be dealt with in special schools. Despite substantial progress, the shortage of schools for the educationally subnormal remains the biggest deficiency in the special school system."

Under the National Health Service, the administration of mental deficiency institutions is in the charge of the regional hospital boards, but the ascertainment of mental defectives and their supervision when they live in the community is the responsibility of the local health authorities.

Information can be obtained from the schools medical officer of the locality.

Hormone Therapy in Endometriosis

Q.—*Does endocrine therapy relieve the symptoms of pelvic endometriosis, in particular menorrhagia, metrorrhagia, and attacks of abdominal pain? If so, what scheme of treatment is advised?*

A.—The endocrine treatment of pelvic endometriosis is not very satisfactory. Massive doses of progesterone have been tried, with equivocal results. Testosterone, however, will always control symptoms temporarily, and in a big enough dose will suppress the activity of both the normal and aberrant endometrium. The difficulty is that large doses given for a long time are likely to have virilizing effects. Moreover, when treatment is suspended, symptoms usually recur. It might be worth while giving methyl testosterone 10 mg. sublingually daily for two months. This is a moderate dose, and if it gives relief and does not cause virilism it might be repeated after an interval of one or two months.

Adaptability of Infants to Changes of Climate

Q.—*What influence should climatic factors have in deciding when to let a healthy infant travel to the Tropics (West Africa)? In view of the longer period for acclimatization, is sea travel preferable to flying? At what age is the journey best tolerated?*

A.—If the child is to live on the Nigerian plateau it may be introduced at any time. The best weather in coastal regions in West Africa is roughly between November and February. The wet season should be avoided if possible. Children are not upset as a rule by flying or by sudden transition from cold to heat. Flying in the wet season, particularly in July and August, is often bumpy and unpleasant, and some stations may be difficult to reach, especially in the Cameroons. Apart from this there are no particular disadvantages in flying.

The child should be taken out as a young infant, if possible while still on the breast, as breast milk is the most sterile form of food it is likely to get. The newly weaned infant is liable to be plagued with gastro-intestinal disturbances due to changes in diet and infection, and as a general rule clean fresh milk is not available on the west coast, and powdered milk will be required. In the very young child the risk of malaria is probably slight if it receives reasonable maternal attention, drug prophylaxis, and sleeps under a net. In highly endemic regions, however, it is probably inadvisable to introduce a baby during the periods of maximum transmission.

Leopard Society

Q.—*Where can I find information on leopard societies?*

A.—On p. 76 of the book "*Any Questions?*" The book can be obtained for 7s. 6d. (postage 6d.) from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 4499. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.
Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.
ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 4499. TELEGRAMS: *Britmedads, Westcent, London.*
MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 4499. TELEGRAMS: *Medsecra, Westcent, London.*
B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.